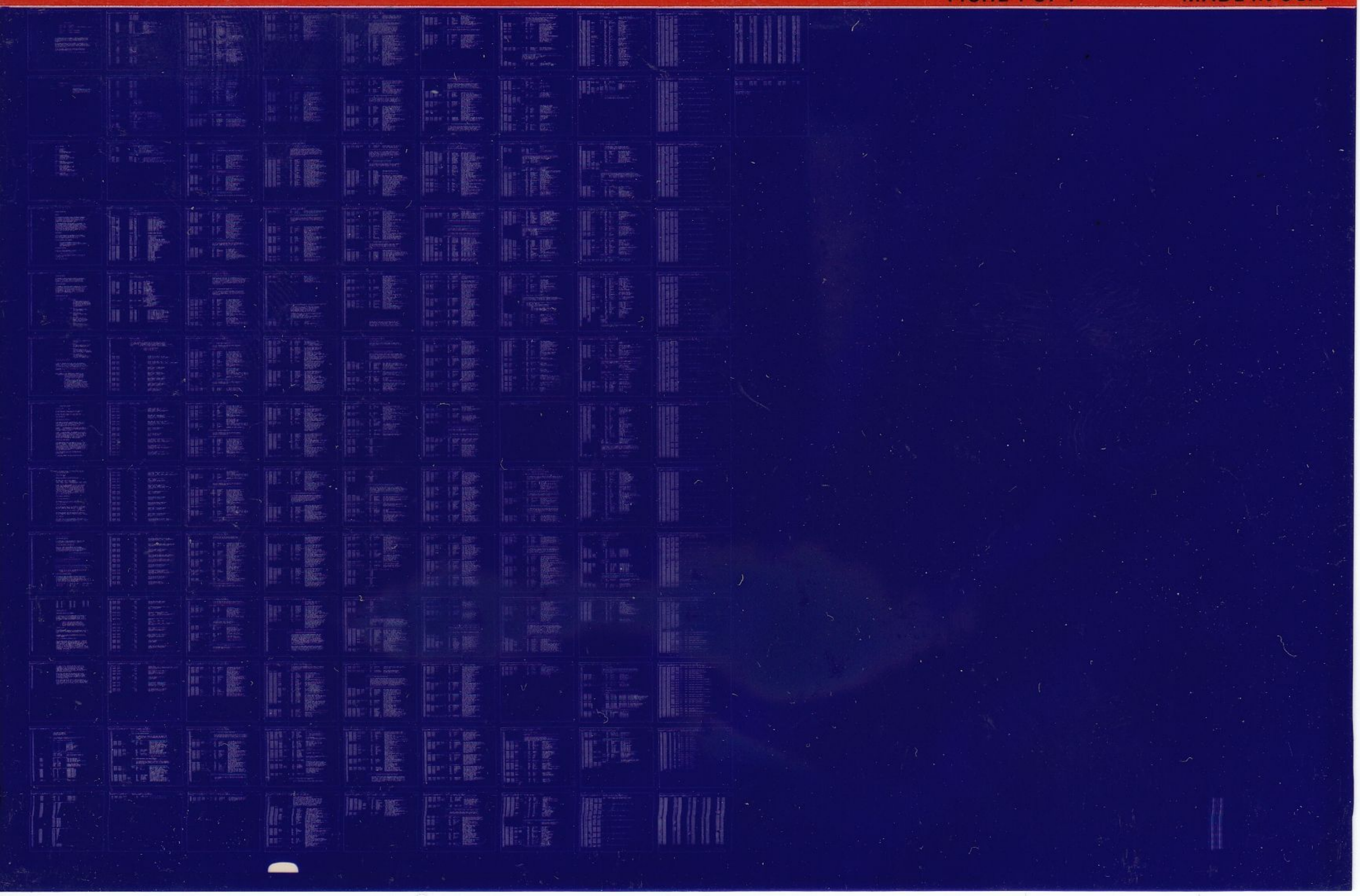
PDP11/23

KTF11-AA DIAG
CJKDAB0

AH-F137B-MC

FICHE 1 OF 1

SEP 1979
digital
MADE IN USA



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                .REM    @
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IDENTIFICATION

PRODUCT CODE: AC-F138B-MC

PRODUCT NAME: CJKDAB0 KTF11-AA MEMORY MANAGEMENT DIAGNOSTIC

DATE: JUNE-1979

MAINTAINER: DIAGNOSTIC PROGRAMMIMG

AUTHOR: DIAGNOSTIC ENGINEERING

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PROGRAM HISTORY

DATE	REVISION	REASON FOR REVISION
12-JAN-79	A	FIRST RELEASE
JUNE-79	B	SUBROUTINE FORMPA MODIFIED ERROR INFORMATION STORED IN R0,R2. THIS REVISION SAVES THE REGISTERS ON ENTRY TO THE ROUTINE AND RESTORES THEM ON EXIT.

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 KDF11-A 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 DIAGNOSTIC SHOULD BE RUN:

CJKDB DCF11-AA CPU 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. SINCE 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)

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 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
        ---------------------------


        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 30 SECONDS.

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

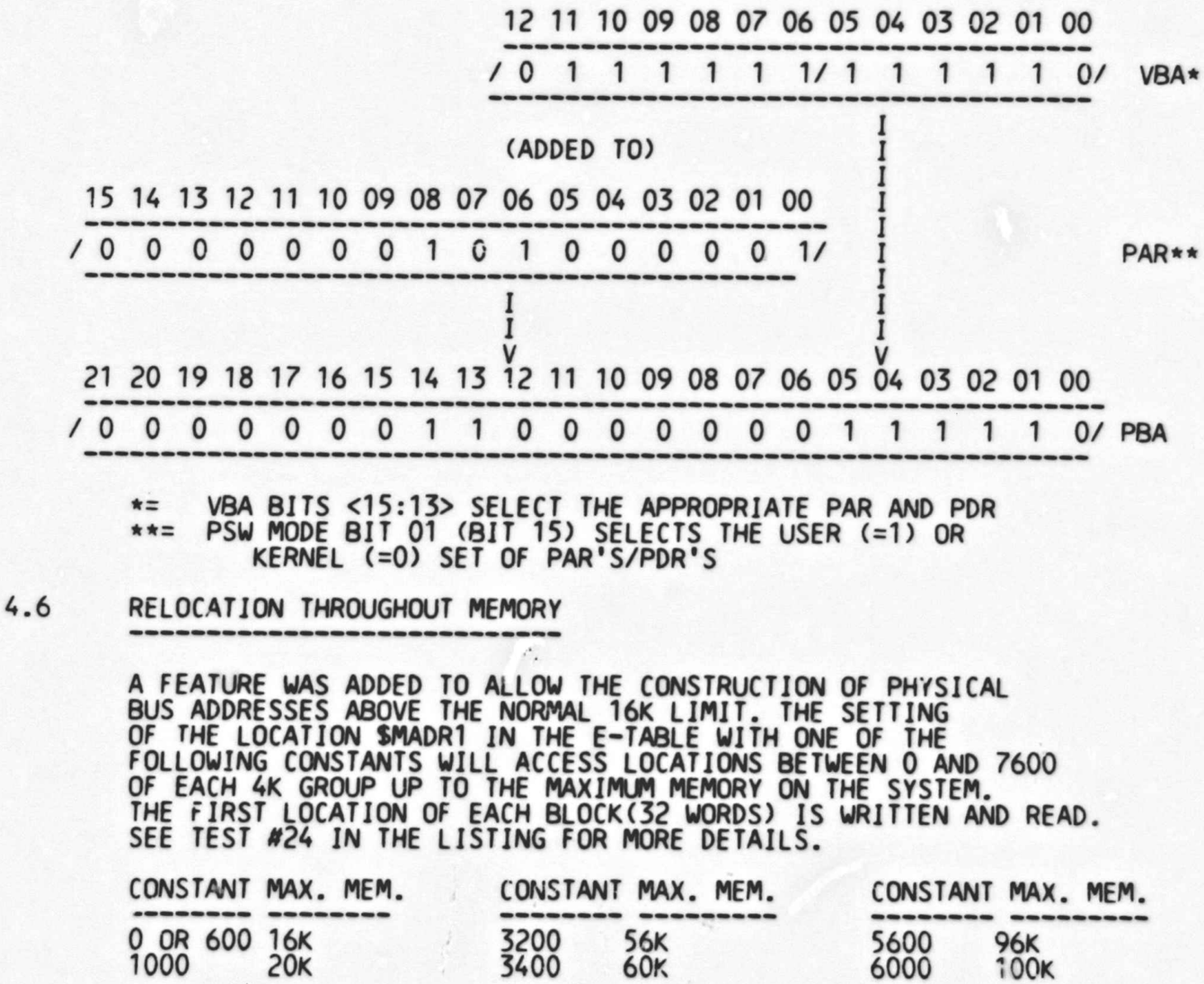
REGISTER (SEE SECTION 2.4).

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 'RESTRT:''

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

4.6 RELOCATION THROUGHOUT MEMORY

A FEATURE WAS ADDED TO ALLOW THE CONSTRUCTION OF PHYSICAL BUS ADDRESSES ABOVE THE NORMAL 16K LIMIT. THE SETTING OF THE LOCATION $MADR1 IN THE E-TABLE WITH ONE OF THE FOLLOWING CONSTANTS WILL ACCESS LOCATIONS BETWEEN 0 AND 7600 OF EACH 4K GROUP UP TO THE MAXIMUM MEMORY ON THE SYSTEM. THE FIRST LOCATION OF EACH BLOCK(32 WORDS) IS WRITTEN AND READ. SEE TEST #24 IN THE LISTING FOR MORE DETAILS.

CONSTANT	MAX. MEM.	CONSTANT	MAX. MEM.	CONSTANT	MAX. MEM.
0 OR 600	16K	3200	56K	5600	96K
1000	20K	3400	60K	6000	100K

1200	24K	3600 64K 6200 104K
1400	28K	4000 68K 6400 108K
1600	32K	4200 72K 6600 112K
2000	36K	4400 76K 7000 116K
2200	40K	4600 80K 7200 120K
2400	44K	5000 84K 7400 124K
2600	48K	5200 88K 7600 128K
3000	52K	5400 92K

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

```
485                                     REG. EQUAL TO "0", THEN YOU ARE ABLE TO LOOK AT ALL
486                                     THE ERRORS THAT MAY BE RELATED TO THE FAULT YOU ARE
487                                     DIAGNOSING.  A FAULT IN AN EARLIER TEST MAY RESULT IN
488                                     ERRORS DURING LATER TESTS WHICH MAY GIVE YOU MORE
489                                     CLUES ABOUT THE NATURE OF THE FAULT.  NOW USE THE METHOD
490                                     OUTLINED IN SECTION 3.2 FOR EACH ERROR TO GATHER AS
491                                     MUCH INFORMATION AS POSSIBLE.
492
493                                     NOW TO TEST YOUR IDEAS ON THE CAUSE OF THE FAILURE,
494                                     YOU MAY WANT TO SCOPE THIS ERROR CONDITION.  SET BIT 09
495                                     OF THE SWITCH REG. EQUAL TO "1" TO LOOP ON THE ERROR.
496                                     FOR AN EVEN TIGHTER SCOPE LOOP THE ERROR CALL CAN BE
497                                     REPLACED WITH A BRANCH (REFER TO COMMENTS BY ERROR CALLS
498                                     IN THE PROGRAM LISTING).
499
500                                     OR YOU COULD LOOP ON THE TEST BY EITHER SETTING BIT 14
501                                     OF THE SWITCH REG. EQUAL TO "1" OF BY SETTING BIT 08 OF THE
502                                     SWITCH REG. EQUAL TO "1" AND THEN SETTING THE TEST NUMBER
503                                     IN BITS 07-00 OF THE SWITCH REG.  YOU WILL PROBABLY WANT TO
504                                     INHIBIT ERROR TYPEOUTS BY SETTING BIT 13 OF THE SWITCH REG.
505                                     EQUAL TO "1".
506
507
508
509
510                             @
511
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                                .TITLE  MD-11-CJKDA-B KTF11-AA MMU DIAG
                                ;*COPYRIGHT (C) JUNE-79
                                ;*DIGITAL EQUIPMENT CORP.
                                ;*MAYNARD, MASS. 01754
                                ;*
                                ;*
                                ;*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
```

```
                        PR2=    100             ;;PRIORITY LEVEL 2
                        PR3=    140             ;;PRIORITY LEVEL 3
                        PR4=    200             ;;PRIORITY LEVEL 4
                        PR5=    240             ;;PRIORITY LEVEL 5
                        PR6=    300             ;;PRIORITY LEVEL 6
                        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
```

```
                                KIPDR0= 172300
                                KIPDR1= 172302
                                KIPDR2= 172304
                                KIPDR3= 172306
                                KIPDR4= 172310
                                KIPDR5= 172312
                                KIPDR6= 172314
                                KIPDR7= 172316

                                ;*KERNEL "I" PAGE ADDRESS REGISTERS

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

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

                                ;*ADDITIONAL DEFINITIONS
                                ;*


                                .SBTTL  TRAP CATCHER

                                        .=0
                                ;*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 000000                   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
                                        $SVPC=.                 ;SAVE PC
                                        .=46
000046 034072                           $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
                                        .=52
000052 000000                           .WORD   0               ;;2)SET LOC.52 TO ZERO
                                        .=$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
000024           000200                         200      ;;FOR APT START UP
                 000044                         .=44     ;;POINT TO APT INDIRECT ADDRESS PNTR.
000044           000204                         $APTHDR  ;;POINT TO APT HEADER BLOCK
                 000204                         .=.$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  000016                                  .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
```

```
                        $LF:    .ASCIZ  <12>                    ;;LINE FEED
                        ;;*****************************************************************
                        .SBTTL  APT MAILBOX-ETABLE

                        ;;*****************************************************************
                        .EVEN
001226                  $MAIL:                                  ;;APT MAILBOX
001226  000000          $MSGTY: .WORD   AMSGTY                  ;;MESSAGE TYPE CODE
001230  000000          $FATAL: .WORD   AFATAL                  ;;FATAL ERROR NUMBER
001232  000000          $TESTN: .WORD   ATESTN                  ;;TEST NUMBER
001234  000000          $PASS:  .WORD   APASS                   ;;PASS COUNT
001236  000000          $DEVCT: .WORD   ADEVCT                  ;;DEVICE COUNT
001240  000000          $UNIT:  .WORD   AUNIT                   ;;I/O UNIT NUMBER
001242  000000          $MSGAD: .WORD   AMSGAD                  ;;MESSAGE ADDRESS
001244  000000          $MSGLG: .WORD   AMSGLG                  ;;MESSAGE LENGTH
001246                  $ETABLE:                                ;;APT ENVIRONMENT TABLE
001246  000             $ENV:   .BYTE   AENV                    ;;ENVIRONMENT BYTE
001247  000             $ENVM:  .BYTE   AENVM                   ;;ENVIRONMENT MODE BITS
001250  000000          $SWREG: .WORD   ASWREG                  ;;APT SWITCH REGISTER
001252  000000          $USWR:  .WORD   AUSWR                   ;;USER SWITCHES
001254  000000          $CPUOP: .WORD   ACPUOP                  ;;CPU TYPE,OPTIONS
                        ;*                                      BITS 15-11=CPU TYPE
                        ;*                                              11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
                        ;*                                              11/70=06,PDQ=07,Q=10
                        ;*                                      BIT 10=REAL TIME CLOCK
                        ;*                                      BIT  9=FLOATING POINT PROCESSOR
                        ;*                                      BIT  8=MEMORY MANAGEMENT
001256  000             $MAMS1: .BYTE   AMAMS1                  ;;HIGH ADDRESS,M.S. BYTE
001257  000             $MTYP1: .BYTE   AMTYP1                  ;;MEM. TYPE,BLK#1
                        ;*                                      MEM.TYPE BYTE   --  (HIGH BYTE)
                        ;*                                              900 NSEC CORE=001
                        ;*                                              300 NSEC BIPOLAR=002
                        ;*                                              500 NSEC MOS=003
001260  000000          $MADR1: .WORD   AMADR1                  ;;HIGH ADDRESS,BLK#1
                        ;*                                        MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF ''TYPE'' ABOVE
001262                  $ETEND:
                        .MEXIT

001262  000000          TESTNO: .WORD   0               ;HOLDS TEST NUMBER FOR TYPEOUTS
001264  000000          WASR6:  .WORD   0               ;USED TO STORE THE STACK POINTER AFTER A TRAP
001266  000000          TRAPPC: .WORD   0               ;USED TO STORE THE PC OF A TRAP OR ABORT
001270  000000          TRAPPS: .WORD   0               ;USED TO STORE THE PS OF A TRAP OR ABORT
001272  000000          WASSR0: .WORD   0               ;USED TO STORE CONTENTS OF SR0
001274  000000          WASSR2: .WORD   0               ;USED TO STORE CONTENTS OR SR2
001276  000000          TBITPS: .WORD   0               ;SAVES THE PSW THAT MAY HAVE ITS T-BIT ON
001300  000000          ANDADR: .WORD   0               ;HOLDS RESULT OF ADDRESSES BEING AND-ED
001302  000000          ORADR:  .WORD   0               ;HOLDS RESULT OF ADDRESSES BEING OR-ED
001304  000000          TONUM:  .WORD   0               ;HOLDS NUMBER OF TIME-OUTS
001306  000000          VIRT1:  .WORD   0               ;HOLDS VIRTUAL ADDRESS TO BE CONVERTED
001310  000000          VIRT2:  .WORD   0               ;  ''       ''      ''
001312  000000          PBALO:  .WORD   0               ;HOLDS BITS <15:00> OF PHYSICAL ADDRESS
001314  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


001316                          $ERRTB:

                                ;*ITEM 1
001316  040740                          EM1                     ;UNEXPECTED CPU TRAP TO LOC. 004
001320  044031                          DH1                     ;OLD PC  OLD PSW R6 WAS  TESTNO  ERRORPC
001322  047236                          DT1                     ;TRAPPC, TRAPPS, WASR6, TESTNO, $ERPPC, 0
001324  050046                          DF1                     ;0,0,0,0,0

                                ;*ITEM 2
001326  041000                          EM2                     ;UNEXPECTED MEM. MGMT. TRAP TO LOC. 250
001330  044101                          DH2                     ;OLD PC  OLD PSW R6 WAS  SR0     SR2     TESTNO  ERRORPC
001332  047252                          DT2                     ;TRAPPC, TRAPPS, WASR6, WASSR0, WASSR2, TESTNO, $ERRPC,
001334  050053                          DF2                     ;0,0,0,0,0,0,0

                                ;*ITEM 3
001336  041047                          EM3                     ;PRIORITY BITS SET WRONG IN PSW
001340  044171                          DH3                     ;WROTE   READ    TESTNO  ERRORPC
001342  047272                          DT3                     ;$REG0,$REG1,TESTNO,$ERRPC,0
001344  050062                          DF3                     ;0,0,0,0

                                ;*ITEM 4
001346  041106                          EM4                     ;MODE BITS SET WRONG IN PSW
001350  044171                          DH3                     ;WROTE   READ    TESTNO  ERRORPC
001352  047272                          DT3                     ;$REG0,$REG1,TESTNO,$ERRPC,0
001354  050062                          DF3                     ;0,0,0,0

                                ;*ITEM 5
001356  041141                          EM5                     ;DUAL ADDRESSING BETWEEN HI&LO BYTES OF PSW
001360  044171                          DH3                     ;WROTE   READ    TESTNO  ERRORPC
001362  047272                          DT3                     ;$REG0,$REG1,TESTNO,$ERRPC,0
001364  050062                          DF3                     ;0,0,0,0

                                ;*ITEM 6
001366  041214                          EM6                     ;KERNEL R6 CHANGED BY WRITING USER R6
001370  044171                          DH3                     ;WROTE   READ    TESTNO  ERRORPC
001372  047272                          DT3                     ;$REG0,$REG1,TESTNO,$ERRPC,0
001374  050062                          DF3                     ;0,0,0,0

                                ;*ITEM 7
001376  041261                          EM7                     ;A MEMORY MGMT. REG. TIMED OUT
001400  044231                          DH7                     ;ADDRESS TESTNO  ERRORPC
001402  047304                          DT7                     ;$REG0,TESTNO,$ERRPC,0
```

```
                                DF7                     ;0,0,0

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

                        ;*ITEM 11
                                FM11                    ;MEM. MGMT. REG. WOULD NOT CLEAR
                                DH11                    ;REGISTR READ    READ-(BINARY)
                                                        ;ADDRESS (OCTAL) 543210987654321 0  TESTNO  ERRORPC
                                DT11                    ;$REG0,$REG1,$REG1,TESTNO,$ERRPC,0
                                DF11                    ;0,0,2,0,0

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

                        ;*ITEM 13
                                EM13                    ;SR0 EFFECTED BY WRITE TO PSW
                                DH13                    ;READ    TESTNO  ERRORPC
                                DT13                    ;$REG0,TESTNO,$ERRPC,0
                                DF13                    ;0,0,0

                        ;*ITEM 14
                                EM14                    ;SR1 DID NOT READ ALL ZEROS
                                DH13                    ;READ    TESTNO  ERRORPC
                                DT13                    ;$REG0,TESTNO,$ERRPC,0
                                DF13                    ;0,0,0

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

                        ;*ITEM 16
                                EM16                    ;DUAL ADDRESSING BETWEEN PAR-PDR'S
                                DH16                    ;PAR-PDR PAR-PDR
                                                        ;CLEARED EFFECTD EXPECTD RECEIVD TESTNO ERRORPC
                                DT16                    ;$REG0,$REG1,$REG5,$REG2,TESTNO,$ERRPC,0
                                DF16                    ;0,0,0,0,0,0

                        ;*ITEM 17
                                EM17                    ;PHYS. ADDR. FORMED READ WRONG
                                DH17                    ;PHYSICAL VIRTUAL
                                                        ;ADDRESS ADDRESS KIPAR4  TESTNO  ERRORPC
                                DT17                    ;PBALO,VIRT1,$REG4,TESTNO,$ERRPC,0
                                DF17                    ;3,0,0,0,0
```

```
                                ;*ITEM 20
001506  041736                          EM20            ;PHYS. ADDR. FORMED READ WRONG IN RELOCATE MODE
001510  045061                          DH20            ;PHYSICL PAR 4   PAR 5
                                                        ;ADDRESS VBA     VBA     PAR 4   PAR 5   PSW     TESTNO
001512  047424                          DT20            ;PBALO,VIRT1,VIRT2,$REG4,$REG5,$TMP0,TESTNO,$ERRPC,0
001514  050127                          DF20            ;3,0,0,0,0,0,0,0

                                ;*ITEM 21
001516  042010                          EM21            ;W-BIT DID NOT GET SET IN PDR
001520  045207                          DH21            ;PDR     VIRTUAL
                                                        ;TESTED  ADDRESS TESTNO  ERRORPC
001522  047446                          DT21            ;$REG5,$REG3,TESTNO,$ERRPC,0
001524  050137                          DF21            ;0,0,0,0

                                ;*ITEM 22
001526  042045                          EM22            ;W-BIT SET IN MORE THAN ONE PDR
001530  045267                          DH22            ;PDR IN  PDR     VIRTUAL
                                                        ;ERROR   TESTED  ADDRESS TESTNO  ERRORPC
001532  047460                          DT22            ;$REG0,$REG5,$REG3,TESTNO,$ERRPC,0
001534  050143                          DF22            ;0,0,0,0,0

                                ;*ITEM 23
001536  042104                          EM23            ;W-BIT NOT CLEARED BY WRITING TO PDR
001540  045366                          DH23            ;PDR     TESTNO  ERRORPC
001542  047474                          DT23            ;$REG5,TESTNO,$ERRPC,0
001544  050150                          DF23            ;0,0,0

                                ;*ITEM 24
001546  042150                          EM24            ;WRITING SR0 SET W-BIT IN KIPDR7
001550  045416                          DH24            ;PDR WAS EXPECTD TESTNO  ERRORPC
001552  047504                          DT24            ;$REG2,$REG1,TESTNO,$ERRPC,0
001554  050153                          DF24            ;0,0,0,0

                                ;*ITEM 25
001556  042210                          EM25            ;W-BIT GOT SET DURING TIMEOUT ABORT
001560  045416                          DH24            ;PDR WAS EXPECTD TESTNO  ERRORPC
001562  047504                          DT24            ;$REG2,$REG1,TESTNO,$ERRPC,0
001564  050153                          DF24            ;0,0,0,0

                                ;*ITEM 26
001566  042253                          EM26            ;MEMORY MGMT. ACCESS ABORT DID NOT OCCUR
001570  045456                          DH26            ;PDR 4   PSW     TESTNO  ERRORPC
001572  047516                          DT26            ;$REG2,$TMP0,TESTNO,$ERRPC,0
001574  050153                          DF24            ;0,0,0,0

                                ;*ITEM 27
001576  042323                          EM27            ;ACCESS ERROR DID NOT ABORT INSTRUCTION
001600  045456                          DH26            ;PDR 4   PSW     TESTNO  ERRORPC
001602  047516                          DT26            ;$REG2,$TMP0,TESTNO,$ERRPC,0
001604  050153                          DF24            ;0,0,0,0

                                ;*ITEM 30
001606  042372                          EM30            ;SR0 DID NOT REPORT ACCESS ERROR CORRECTLY
001610  045516                          DH30            ;SR0 WAS EXPECTD PDR 4   PSW     TESTNO ERRORPC
001612  047530                          DT30            ;WASSR0,$REG3,$REG2,$TMP0,TESTNO,$ERRPC,0
001614  050157                          DF30            ;0,0,0,0,0,0
```

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1031
1032                                    ;*ITEM 31
1033  001616  042444                        EM31    ;SR2 DID NOT LOCKUP CORRECT VIRTUAL ADDR.
1034  001620  045576                        DH31    ;SR2 WAS EXPECTD PDR 4   PSW     TESTNO ERRORPC
1035  001622  047546                        DT31    ;WASSR2,$REG4,$REG2,$TMP0,TESTNO,$ERRPC,0
1036  001624  050157                        DF30    ;0,0,0,0,0,0
1037
1038                                    ;*ITEM 32
1039  001626  042511                        EM32    ;PAGE LGTH. ABORT OCCURRED WHEN IT SHOULDN'T HAVE
1040  001630  045656                        DH32    ;V.B.A.  KIPDR4  SR0 WAS SR2 WAS TESTNO  ERRORPC
1041  001632  047564                        DT32    ;$REG0,$REG4,WASSR0,WASSR2,TESTNO,$ERRPC,0
1042  001634  050157                        DF30    ;0,0,0,0,0,0
1043
1044                                    ;*ITEM 33
1045  001636  042572                        EM33    ;PAGE LGTH. ABORT DID NOT OCCUR WHEN IT SHOULD HAVE
1046  001640  045736                        DH33    ;V.B.A.  KIPDR4  TESTNO  ERRORPC
1047  001642  047602                        DT33    ;$REG0,$REG4,TESTNO,$ERRPC,0
1048  001644  050153                        DF24    ;0,0,0,0
1049
1050                                    ;*ITEM 34
1051  001646  042655                        EM34    ;SR0 DID NOT REPORT PAGE LGTH. ABORT CORRECTLY
1052  001650  045776                        DH34    ;V.B.A.  KIPDR4  SR0 WAS EXPECTD TESTNO  ERRORPC
1053  001652  047614                        DT34    ;$REG0,$REG4,WASSR0,$REG2,TESTNO,$ERRPC,0
1054  001654  050157                        DF30    ;0,0,0,0,0,0
1055                                    ;*ITEM 35
1056  001656  042444                        EM31    ;SR2 DID NOT LOCKUP CORRECT VIRUAL ADDR.
1057  001660  046056                        DH35    ;V.B.A.  KIPDR4  SR2 WAS EXPECTD TESTNO  ERRORPC
1058  001662  047632                        DT35    ;$REG0,$REG4,WASSR2,$REG3,TESTNO,$ERRPC,0
1059  001664  050157                        DF30    ;0,0,0,0,0,0
1060
1061                                    ;*ITEM 36
1062  001666  042444                        EM31    ;SR2 DID NOT LOCKUP CORRECT VIRUAL ADDR.
1063  001670  046136                        DH36    ;SR2 WAS EXPECTD TESTNO  ERRORPC
1064  001672  047650                        DT36    ;WASSR2,$REG1,TESTNO,$ERRPC,0
1065  001674  050153                        DF24    ;0,0,0,0
1066
1067                                    ;*ITEM 37
1068  001676  042733                        EM37    ;SR0 OR SR2 CHANGED BY A SECOND ABORT
1069  001700  046176                        DH37    ;FIRST ABORT     SECOND ABORT
1070                                                ;SR0 WAS SR2 WAS SR0 WAS SR2 WAS TESTNO  ERRORPC
1071  001702  047662                        DT37    ;$TMP0,$TMP2,WASSR0,WASSR2,TESTNO,$ERRPC,0
1072  001704  050157                        DF30    ;0,0,0,0,0,0
1073
1074                                    ;*ITEM 40
1075  001706  043000                        EM40    ;SR0 OR SR2 WAS NOT 'RESET' BY A RESET
1076  001710  046313                        DH40    ;SR0 WAS SR2 WAS TESTNO  ERRORPC
1077  001712  047700                        DT40    ;WASSR0,WASSR2,TESTNO,$ERRPC,0
1078  001714  050153                        DF24    ;0,0,0,0
1079
1080                                    ;*ITEM 41
1081  001716  043047                        EM41    ;SR2 NOT TRACKING CORRECTLY
1082  001720  046136                        DH36    ;SR2 WAS EXPECTD TESTNO  ERROPC
1083  001722  047650                        DT36    ;WASSR2,$REG1,TESTNO,$ERRPC,0
1084  001724  050153                        DF24    ;0,0,0,0
1085
1086                                    ;*ITEM 42
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1087  001726  043102                    EM42            ;DID NOT TRAP THRU KERNEL SPACE
1088  001730  046353                    DH42            ;PSW WAS R6 WAS  TESTNO  ERRORPC
1089  001732  047712                    DT42            ;$REG1,$REG2,TESTNO,$ERRPC,0
1090  001734  050153                    DF24            ;0,0,0,0
1091
1092                                  ;*ITEM 43
1093  001736  043141                    EM43            ;KT ERROR NOT SERVICED ON TIMEOUT ERROR
1094  001740  045366                    DH23            ;PDR     TESTNO  ERRORPC
1095  001742  047474                    DT23            ;$REG5,TESTNO,$ERRPC,0
1096  001744  050150                    DF23            ;0,0,0
1097
1098                                  ;*ITEM 44
1099  001746  043210                    EM44            ;SR0 OR SR2 CHANGED BY TIMEOUT ERROR
1100  001750  046413                    DH44            ;EXPECTED         RECEIVED
1101                                                    ;SR0     SR2      SR0 WAS SR2 WAS TESTNO  ERRORPC
1102  001752  047724                    DT44            ;$REG0,$REG1,WASSR0,WASSR2,TESTNO,$ERRPC,0
1103  001754  050157                    DF30            ;0,0,0,0,0,0
1104
1105                                  ;*ITEM 45
1106  001756  043254                    EM45            ;ERROR DURING 'DOUBLE ERROR'' (KT & ODD ADDR.)
1107  001760  046525                    DH45            ;EXPECTED:
1108                                                    ;PSW     PC        SR0      SR2
1109                                                    ,170017  (3$+4)  020147  (3$)
1110                                                    ;RECEIVED
1111                                                    ;PSW     PC        SR0      SR2     TESTNO  ERRORPC
1112  001762  047742                    DT45            ;$REG1,$REG3,WASSR0,WASSR2,TESTNO,$ERRPC,0
1113  001764  050157                    DF30            ;0,0,0,0,0,0
1114
1115                                  ;*ITEM 46
1116  001766  043327                    EM46            ;MFPI INSTRUCTION PUSHED WRONG DATA
1117  001770  046722                    DH46            ;DATA    DATA
1118                                                    ;EXPECTD RECEIVD TESTNO  ERRORPC
1119  001772  047760                    DT46            ;$REG0,$REG1,TESTNO,$ERRPC,0
1120  001774  050165                    DF46            ;0,0,0,0
1121
1122                                  ;*ITEM 47
1123  001776  043372                    EM47            ;MTPI INSTRUCTION LOADED WRONG DATA
1124  002000  046722                    DH46            ;DATA    DATA
1125                                                    ;EXPECTD RECEIVD TESTNO  ERRORPC
1126  002002  047760                    DT46            ;$REG0,$REG1,TESTNO,$ERRPC,0
1127  002004  050165                    DF46            ;0,0,0,0
1128
1129                                  ;*ITEM 50
1130  002006  043435                    EM50            ;STACK NOT PUSHED BY MFPI-MTPI
1131  002010  046777                    DH50            ;TESTNO  ERRORPC
1132  002012  047772                    DT50            ;TESTNO,$ERRPC,0
1133  002014  050171                    DF50            ;0,0
1134
1135                                  ;*ITEM 51
1136  002016  043473                    EM51            ;KERNEL PAGE ACCESSED INSTEAD OF USER: MFPI-MTPI
1137  002020  047017                    DH51            ;SR0 WAS SR2 WAS TESTNO  ERRORPC
1138  002022  050000                    DT51            ;WASSR0,WASSR2,TESTNO,$ERRPC,0
1139  002024  050173                    DF51            ;0,0,0,0
1140
1141                                  ;*ITEM 52
1142  002026  043551                    EM52            ;WRONG PDR'S REFERENCED WHILE IN RELOCATE MODE
```

```
1143  002030  047057                    DH52                ;PHYSICL PAR 4
1144                                                        ;ADDRESS V.B.A.  PAR 4   SR0 WAS SR2 WAS PSW    TESTNO
1145  002032  050012                    DT52                ;PBALO,VIRT1,$REG4,WASSR0,WASSR2,$TMP0,TESTNO,$ERRPC,0
1146  002034  050177                    DF52                ;3,0,0,0,0,0,0,0
1147                              ;*ITEM 53
1148  002036  043627                    EM53                ;MFPD INSTRUCTION PUSHED WRONG DATA
1149  002040  046722                    DH46                ;DATA    DATA
1150                                                        ;EXPECTD RECEIVD TESTNO  ERRORPC
1151  002042  047760                    DT46                ;$REG0,$REG1,TESTNO,$ERRPC,0
1152  002044  050165                    DF46                ;0,0,0,0
1153
1154                              ;*ITEM 54
1155  002046  043672                    EM54                ;STACK NOT PUSHED BY MFPD-MTPD
1156  002050  046777                    DH50                ;TESTNO  ERRORPC
1157  002052  047772                    DT50                ;TESTNO,$ERRPC,0
1158  002054  050171                    DF50                ;0,0
1159
1160                              ;*ITEM 55
1161  002056  043730                    EM55                ;PAR OR PDR WAS CHANGED BY A RESET
1162  002060  044361                    DH11                ;REGISTR READ    READ-(BINARY)
1163                                                        ;ADDRESS (OCTAL) 5432109876543210  TESTNO  ERRORPC
1164  002062  047330                    DT11                ;$REG0,$REG1,$REG1,TESTNO,$ERRPC,0
1165  002064  050076                    DF11                ;0,0,2,0,0
1166
1167                              ;*ITEM 56
1168  002066  043766                    EM56                ;PSW CHANGED BY AN RTI IN USER MODE
1169  002070  047175                    DH56                ;PSW WAS EXPECTD TESTNO  ERRORPC
1170  002072  050034                    DT56                ;$REG1,$REG2,TESTNO,$ERRPC,0
1171  002074  050207                    DF56                ;0,0,0,0
1172
1173
```

```
                                        .SBTTL  *****   TRAP HANDLING ROUTINES  *****

                                        .SBTTL  CPU TRAP HANDLER ROUTINE
                                        ;;*******************************************************************
                                        ;*
                                        ;*      THIS SUBROUTINE WILL HANDLE ALL CPU TRAPS AND ABORTS THRU
                                        ;*      ''ERRVEC'' (LOC. 004).  IF THIS SUBROUTINE IS ENTERED BY A
                                        ;*      SECOND TRAP BEFORE THE FIRST HAS BEEN SERVICED, A HALT IS
                                        ;*      EXECUTED.
                                        ;*
                                        ;;*******************************************************************
002076  005227                  TIMERR: INC     (PC)+           ;MAKE FLAG ZERO IF FIRST TIME THRU
002100  177777                  TIMFLG: .WORD   -1              ;NEGATIVE ONE FOR ''HAVE ENTERED'' FLAG
002102  001403                          BEQ     1$              ;BRANCH IF FIRST TIME IN
002104  005237  001226                  INC     $MSGTYPE        ;TELL APT THERE WAS AN ERROR
002110  000000                          HALT                    ;STOP! - I'VE ENTERED THIS ROUTINE
                                                                ;A SECOND TIME BEFORE I FINISHED
                                                                ;REPORTING THE FIRST ERROR.  THE
                                                                ;SECOND ENTRY ADDRESS SHOULD BE ON
                                                                ;THE KERNEL STACK.
002112  012637  001266          1$:     MOV     (KSP)+,TRAPPC   ;SAVE PC+2 AT TIME OF ABORT
002116  012637  001270                  MOV     (KSP)+,TRAPPS   ;SAVE PS AT TIME OF ABORT
002122  010637  001264                  MOV     KSP,WASR6       ;SAVE STACK POINTER VALUE
002126  104001                          ERROR   1               ;UNEXPECTED TRAP OR ABORT TO LOC. 4
002130  012737  177777  002100          MOV     #-1,TIMFLG      ;MAKE FLAG NEGATIVE ONE FOR NEXT TIME
002136  013746  001270                  MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
002142  013746  001266                  MOV     TRAPPC,-(KSP)
002146  000006                          RTT                     ;RETURN FROM INTERRUPT OR ABORT


                                        .SBTTL  MEMORY MANAGEMENT TRAP HANDLER ROUTINE
                                        ;;*******************************************************************
                                        ;*
                                        ;*      THIS SUBROUTINE WILL HANDLE ALL UNEXPECTED MEMORY MANAGEMENT
                                        ;*      TRAPS AND ABORTS THRU ''MMVEC'' (LOC. 250).  IF THIS SUBROUTINE IS
                                        ;*      ENTERED BY A SECOND TRAP BEFORE THE FIRST HAS BEEN SERVICED, A
                                        ;*      HALT IS EXECUTED.
                                        ;*
                                        ;;*******************************************************************
002150  005227                  MGMERR: INC     (PC)+           ;MAKE FLAG ZERO IF FIRST TIME THRU
002152  177777                  MGMFLG: .WORD   -1              ;NEGATIVE ONE FOR ''HAVE ENTERED'' FLAG
002154  001403                          BEQ     1$              ;BRANCH IF FIRST TIME IN
002156  005237  001226                  INC     $MSGTYPE        ;TELL APT THERE WAS AN ERROR
002162  000000                          HALT                    ;STOP! - I'VE ENTERED THIS ROUTINE
                                                                ;A SECOND TIME BEFORE I FINISHED
                                                                ;REPORTING THE FIRST ERROR.  THE
                                                                ;SECOND ENTRY ADDRESS SHOULD BE ON
                                                                ;THE KERNEL STACK.
002164  012637  001266          1$:     MOV     (KSP)+,TRAPPC   ;SAVE PC+2 AT TIME OF ABORT
002170  012637  001270                  MOV     (KSP)+,TRAPPS   ;SAVE PS AT TIME OF ABORT
002174  010637  001264                  MOV     KSP,WASR6       ;SAVE STACK POINTER VALUE
002200  013737  177572  001272          MOV     SR0,WASSR0      ;SAVE CONTENTS OF KT STATUS REG. 0
002206  013737  177576  001274          MOV     SR2,WASSR2      ;SAVE CONTENTS OF KT STATUS REG. 2
002214  042737  160000  177572          BIC     #160000,SR0     ;CLEAR ERROR BITS IN STATUS REG 0
002222  104002                          ERROR   2               ;UNEXPECTED TRAP OR ABORT TO LOC. 250
002224  012737  177777  002152          MOV     #-1,MGMFLG      ;MAKE FLAG NEGATIVE ONE FOR NEXT TIME
```

```
 1230  002232  013746  001270                  MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
 1231  002236  013746  001266                  MOV     TRAPPC,-(KSP)
 1232  002242  000006                          RTT                     ;RETURN FROM INTERRUPT OR ABORT.
 1233
```

```
1234                                            .SBTTL
1235                                            .SBTTL  *****   STARTING POINT OF TEST  *****
1236                                            .SBTTL  *****   STARTING ADDRESS OF 200 *****
1237            020000                          .=20000
1238
1239    020000                          START:
1240                                    .SBTTL  INITIALIZE THE COMMON TAGS
1241                                    ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
1242    020000  012706  001100                  MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
1243    020004  005026                          CLR     (R6)+           ;;CLEAR MEMORY LOCATION
1244    020006  022706  001140                  CMP     #SWR,R6 ;;DONE?
1245    020012  001374                          BNE     .-6             ;;LOOP BACK IF NO
1246    020014  012706  001100                  MOV     #STACK,SP       ;;SETUP THE STACK POINTER
1247                                    ;;INITIALIZE A FEW VECTORS
1248    020020  012737  034152  000020          MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
1249    020026  012737  000340  000022          MOV     #340,@#IOTVEC+2 ;;LEVEL 7
1250    020034  012737  034432  000030          MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERRCR ROUTINE
1251    020042  012737  000340  000032          MOV     #340,@#EMTVEC+2 ;;LEVEL 7
1252    020050  012737  040424  000034          MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
1253    020056  012737  000340  000036          MOV     #340,@#TRAPVEC+2;LEVEL 7
1254    020064  012737  040512  000024          MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
1255    020072  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;LEVEL 7
1256    020100  013737  033714  033706          MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
1257    020106  005037  001212                  CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
1258    020112  005037  001214                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
1259    020116  112737  000001  001115          MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
1260                                    ;;INITIALIZE THE ''T-BIT'' TRAP VECTOR. THEN LOAD LOCATION ''$RTRN'', IN
1261                                    ;;THE ''END-OF-PASS'' ($EOP) ROUTINE, WITH A ''RTI'' OR ''RTT''.
1262    020124  012737  034136  000014          MOV     #$RTRN,@#TBITVEC ;;SET ''T'' BIT VECTOR TO $RTRN
1263    020132  012737  000340  000016          MOV     #340,@#TBITVEC+2 ;;LEVEL 7
1264    020140  012737  000002  034136          MOV     #RTI,$RTRN      ;;SET $RTRN TO A RTI
1265    020146  012737  020174  000010          MOV     #65$,@#RESVEC   ;;TRY TO DO A RTT
1266    020154  005046                          CLR     -(SP)           ;;DUMMY PS
1267    020156  012746  020164                  MOV     #64$,-(SP)      ;;AND PC
1268    020162  000006                          RTT                     ;;TRY THE RTT
1269    020164  012737  000006  034136  64$:    MOV     #RTT,$RTRN      ;;RTT IS LEGAL--SET $RTRN TO A RTT
1270    020172  000402                          BR      66$
1271    020174  062706  000010          65$:    ADD     #10,SP          ;;RTT ILLEGAL--CLEAN OFF THE STACK
1272    020200  012737  000012  000010  66$:    MOV     #RESVEC+2,@#RESVEC ;;RESTORE TRAP CATCHER
1273    020206  005037  034144                  CLR     $TBIT           ;;CLEAR ''T'' BIT SWITCH
1274    020212  012737  020212  001106          MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
1275    020220  012737  020220  001110          MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
1276                                    ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
1277                                    ;;EQUAL TO A ''-1'', SETUP FOR A SOFTWARE SWITCH REGISTER.
1278    020226  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
1279    020232  012737  020266  000004          MOV     #67$,@#ERRVEC   ;;SET UP ERROR VECTOR
1280    020240  012737  177570  001140          MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
1281    020246  012737  177570  001142          MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
1282    020254  022777  177777  160656          CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
1283    020262  001012                          BNE     69$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
1284                                                                    ;;AND  THE HARDWARE SWR IS NOT = -1
1285    020264  000403                          BR      68$             ;;BRANCH IF NO TIMEOUT
1286    020266  012716  020274          67$:    MOV     #68$,(SP)       ;;SET UP FOR TRAP RETURN
1287    020272  000002                          RTI
1288    020274  012737  000176  001140  68$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
1289    020302  012737  000174  001142          MOV     #DISPREG,DISPLAY
```

```
1290  020310  012637  000004          69$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
1291
1292  020314  005037  001234                  CLR     $PASS           ;;CLEAR PASS COUNT
1293  020320  132737  000200  001247          BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
1294  020326  001403                          BEQ     70$             ;;YES,USE NON-APT SWITCH
1295  020330  012737  001250  001140          MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
1296  020336                          70$:
1297                                  ;; INITIALIZE THE ERROR COUNTER FOR EOP REPORT($ERTTL).
1298  020336  005037  001112                  CLR     $ERTTL          ;CLEAR ERROR COUNTER
1299                                  .SBTTL  TYPE PROGRAM NAME
1300                                  ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
1301  020342  005227  177777                  INC     #-1             ;;FIRST TIME?
1302  020346  001051                          BNE     71$             ;;BRANCH IF NO
1303  020350  022737  034072  000042          CMP     #$ENDAD,@#42    ;;ACT-11?
1304  020356  001445                          BEQ     71$             ;;BRANCH IF YES
1305  020360  104401  020426                  TYPE    ,72$            ;;TYPE ASCIZ STRING
1306                                  .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
1307  020364  005737  000042                  TST     @#42            ;;ARE WE RUNNING UNDER XXDP/ACT?
1308  020370  001012                          BNE     73$             ;;BRANCH IF YES
1309  020372  123727  001246  000001          CMPB    $ENV,#1         ;;ARE WE RUNNING UNDER APT?
1310  020400  001406                          BEQ     73$             ;;BRANCH IF YES
1311  020402  023727  001140  000176          CMP     SWR,#SWREG      ;;SOFTWARE SWITCH REG SELECTED?
1312  020410  001005                          BNE     74$             ;;BRANCH IF NO
1313  020412  104407                          GTSWR                   ;;GET SOFT-SWR SETTINGS
1314  020414  000403                          BR      74$
1315  020416  112737  000001  001134  73$:    MOVB    #1,$AUTOB       ;;SET AUTO-MODE INDICATOR
1316  020424                          74$:
1317  020424  000422                          BR      71$             ;;GET OVER THE ASCIZ
1318                                  ;;72$:  .ASCIZ  <CRLF>#MD-11-CJKDA-B KTF11-AA MMU DIAG.#<CRLF>
1319  020472                          71$:
1320
1321  020472                          RESTRT:
1322
1323                                  ;;**************************************************************
1324                                  ;THE FOLLOWING TURNS ON A TIMER ON THE MULTI-OPTION TESTER
1325                                  ;IN MANUFACTORING.
1326
1327  020472  012737  020514  000004  TIMEON: MOV     #LOOP,@#4       ;SETUP RETURN ADDRESS IN CASE OF TIMEOUT
1328  020500  012737  000340  000006          MOV     #340,@#6        ;SETUP PSW
1329  020506  012737  000002  164000          MOV     #2,@#164000     ;SET START BIT IN MULTI-TESTER
1330                                  ;;**************************************************************
1331
1332  020514  012706  001100          LOOP:   MOV     #STACK,KSP      ;INITIALIZE THE STACK POINTER
1333  020520  012737  002076  000004          MOV     #TIMERR,ERRVEC  ;LOAD CPU SERVICE ROUTINE INTO TRAP VECTOR
1334  020526  012737  000340  000006          MOV     #340,ERRVEC+2   ;SET NEW PS TO PRIORITY LEVEL 7-KERNEL
1335  020534  012737  002150  000250          MOV     #MGMERR,MMVEC   ;LOAD MEMORY MANAGENT ROUTINE INTO VECTOR
1336  020542  012737  000340  000252          MOV     #340,MMVEC+2    ;SET NEW PS TO PRIORITY LEVEL 7-KERNEL
1337  020550  012700  177777                  MOV     #-1,R0          ;PUT -1 INTO R0 TO INITIALIZE FLAGS
1338  020554  010037  002100                  MOV     R0,TIMFLG       ;INITIALIZE CPU ERROR FLAG
1339  020560  010037  002152                  MOV     R0,MGMFLG       ;INITIALIZE MEMORY MANAGEMENT ERROR FLAG
1340  020564  012737  000340  001276          MOV     #340,TBITPS     ;INITIALIZE LOG THAT HOLDS T-BIT PSW
1341  020572  005037  177572                  CLR     SR0             ;BE SURE MEM. MGMT IS OFF TO START WITH
1342
```

```
1343
1344
1345                                    ;;*****************************************************************
1346                                    ;*TEST 1        PSW PRIORITY BIT TEST
1347                                    ;*
1348                                    ;*      THIS TEST READS AND WRITES THE PROCESSOR STATUS WORD <7:5> 'PRIORITY BITS''
1349                                    ;*      TO SEE THAT SOME OF THE BASIC 'DATA PATH'' LOGIC IS WORKING.
1350                                    ;*
1351                                    ;;*****************************************************************
1352  020576  000004                    TST1:   SCOPE
1353  020600  012737  020610  001110    1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
1354  020606  005000                            CLR     R0              ;INITIALIZE R0 WITH PRIORITY=0 DATA
1355  020610  005001                    2$:     CLR     R1              ;PREPARE R1 TO ACCEPT DATA READ
1356  020612  106400                            MTPS    R0              ;WRITE PRIORITY BITS IN THE PSW
1357  020614  106701                            MFPS    R1              ;READ BACK THE LOW BYTE OF PSW
1358  020616  042701  177437                    BIC     #177437,R1      ;MASK OFF EVERYTHING EXCEPT PRIORITY BITS
1359  020622  020001                            CMP     R0,R1           ;WAS CORRECT PRIORITY SET IN THE PSW?
1360  020624  001401                            BEQ     3$              ;BRANCH IF YES
1361  020626  104003                            ERROR   3               ;PRIORITY BITS SET WRONG IN PSW
1362                                                                    ;FOR TIGHTER SCOPE LOOP
1363                                                                    ;REPLACE ERROR CALL WITH
1364                                                                    ;'BR 2$'' = 000770
1365  020630  062700  000040            3$:     ADD     #40,R0          ;CHANGE DATA TO NEXT PRIORITY
1366  020634  022700  000400                    CMP     #400,R0         ;HAVE PRIORITIES 0-7 ALL BEEN CHECKED?
1367  020640  001363                            BNE     2$              ;BRANCH IF NO
1368  020642  012737  020600  001110            MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1369
1370                                    ;;*****************************************************************
1371                                    ;*TEST 2        PSW MODE BIT TEST
1372                                    ;*      THIS TEST READS AND WRITES THE PROCESSOR STATUS WORD <15:12> 'MODE BITS''
1373                                    ;*
1374                                    ;;*****************************************************************
1375  020650  000004                    TST2:   SCOPE
1376  020652  012737  020662  001110    1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
1377  020660  005000                            CLR     R0              ;INITIALIZE R0 WITH MODE BITS = 0000
1378  020662  005037  177776            2$:     CLR     PSW             ;INITIALIZE PSW
1379  020666  050037  177776                    BIS     R0,PSW          ;BIT SET THE PSW MODE BITS WITH R0
1380  020672  013701  177776                    MOV     PSW,R1          ;READ BACK THE CONTENTS OF THE PSW
1381  020676  042701  007777                    BIC     #007777,R1      ;MASK OFF EVERYTHING EXCEPT THE MODE BITS
1382  020702  020001                            CMP     R0,R1           ;WERE THE MODE BITS SET CORRECTLY?
1383  020704  001403                            BEQ     3$              ;BRANCH IF YES
1384  020706  005037  177776                    CLR     PSW             ;CLEAR PSW FOR ERROR REPORT
1385  020712  104004                            ERROR   4               ;MODE BITS SET WRONG IN PSW
1386                                                                    ;FOR TIGHTER SCOPE LOOP
1387                                                                    ;REPLACE ERROR CALL WITH
1388                                                                    ;'BR 2$'' = 000763
1389  020714  062700  010000            3$:     ADD     #10000,R0       ;CHANGE MODE BIT DATA
1390  020720  001360                            BNE     2$              ;BRANCH IF STILL MORE COMBINATIONS
1391  020722  012737  020652  001110            MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1392  020730  005037  177776                    CLR     PSW             ;RESET PSW BEFORE LEAVING
1393
1394                                    ;;*****************************************************************
1395                                    ;*TEST 3        BYTE ADDRESSING TEST FOR PSW
1396                                    ;*
1397                                    ;*      THIS TEST WRITES THE HIGH AND LOW BYTES OF THE PROCESSOR STATUS WORD
1398                                    ;*      AND READS THEM BACK TO BE SURE THEY CAN BE WRITTEN INDEPENDENTLY.
```

```
1399                                    ;*
1400                                    ;;*****************************************************************
1401  020734  000004                    TST3:   SCOPE
1402  020736  012737  020744  001110    1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
1403  020744  005037  177776            2$:     CLR     PSW             ;CLEAR THE PSW
1404  020750  012700  000360                    MOV     #360,R0         ;PUT THE HIGH BYTE DATA INTO R0
1405  020754  110037  177777                    MOVB    R0,PSW+1        ;WRITE THE HIGH BYTE OF THE PSW
1406  020760  013701  177776                    MOV     PSW,R1          ;READ BACK THE ENTIRE PSW
1407  020764  042701  007437                    BIC     #007437,R1      ;MASK OFF THE T & CC BITS
1408  020770  000300                            SWAB    R0              ;GET DATA WRITTEN IN HIGH BYTE OF R0
1409  020772  020001                            CMP     R0,R1           ;WAS THE PSW WRITTEN TO CORRECTLY
1410  020774  001403                            BEQ     3$              ;BRANCH IF YES
1411  020776  005037  177776                    CLR     PSW             ;CLEAR PSW FOR ERROR REPORT
1412  021002  104005                            ERROR   5               ;LOW BYTE EFFECTED BY WRITE TO HIGH BYTE OF PSW
1413                                                                    ;FOR TIGHTER SCOPE LOOP
1414                                                                    ;REPLACE ERROR CALL WITH
1415                                                                    ;'BR 2$'' = 000760
1416  021004  012737  021012  001110    3$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
1417  021012  005037  177776            4$:     CLR     PSW             ;CLEAR THE PSW
1418  021016  012700  000340                    MOV     #340,R0         ;PUT THE LOW BYTE DATA INTO R0
1419  021022  110037  177776                    MOVB    R0,PSW          ;WRITE THE LOW BYTE OF THE PSW
1420  021026  013701  177776                    MOV     PSW,R1          ;READ BACK THE ENTIRE PSW
1421  021032  042701  007437                    BIC     #007437,R1      ;MASK OFF THE T&CC BITS
1422  021036  020001                            CMP     R0,R1           ;WAS PSW WRITTEN TO CORRECTLY
1423  021040  001403                            BEQ     5$              ;BRANCH IF YES
1424  021042  005037  177776                    CLR     PSW             ;CLEAR PSW FOR ERROR REPORT
1425  021046  104005                            ERROR   5               ;HIGH BYTE EFFECTED BY WRITE TO LOW BYTE OF PSW
1426                                                                    ;FOR TIGHTER SCOPE LOOP
1427                                                                    ;REPLACE ERROR CALL WITH
1428                                                                    ;'BR 2$'' = 000736
1429  021050  012737  020736  001110    5$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1430
1431                                    ;;*****************************************************************
1432                                    ;*TEST 4        TEST AND SETUP OF STACK POINTERS
1433                                    ;*
1434                                    ;*      THIS TEST SETS THE USER AND KERNEL STACK POINTERS FOR THE
1435                                    ;*      REST OF THE PROGRAM AND MAKES SURE THEY ARE INDEPENDENT OF
1436                                    ;*      EACH OTHER.  KERNEL R6 IS SET TO 1100, USER R6 IS SET TO 700, THEN
1437                                    ;*      KERNEL R6 IS READ TO BE SURE ITS STILL 1100.
1438                                    ;*
1439                                    ;;*****************************************************************
1440  021056  000004                    TST4:   SCOPE
1441  021060  005037  177776                    CLR     PSW             ;GO TO KERNEL MODE
1442  021064  012706  001100                    MOV     #KERSTK,KSP     ;SET KERNEL STACK POINTER TO 1100
1443  021070  012737  140000  177776            MOV     #140000,PSW     ;GO TO USER MODE
1444  021076  012706  000700                    MOV     #USESTK,USP     ;SET USER STACK POINTER TO 700
1445  021102  005037  177776                    CLR     PSW             ;BACK TO KERNEL MODE
1446  021106  022706  001100                    CMP     #KERSTK,KSP     ;IS KERNEL R6 STILL 1100?
1447  021112  001404                            BEQ     TST5            ;;BRANCH IF KERNEL R6 IS OKAY
1448  021114  012700  001100                    MOV     #KERSTK,R0      ;SAVE DATA WRITTEN FOR ERROR REPORT
1449  021120  010601                            MOV     KSP,R1          ;SAVE DATA READ AFTER USER R6 WAS WRITTEN
1450  021122  104006                            ERROR   6               ;KERNEL R6 CHANGED BY WRITING USER R6
1451                                                                    ;FOR TIGHTER SCOPE LOOP
1452                                                                    ;REPLACE ERROR CALL WITH
1453                                                                    ;000756
1454
```

```
                                ;;*****************************************************************
                                ;*
                                ;*      THE NEXT FIVE (5) TESTS WILL TRY TO ADDRESS ALL OF THE
                                ;*      MEMORY MANAGEMENT REGISTERS (SR0,SR1,SR2,SR3,KERNEL & USER PAR/PDR'S).
                                ;*      EVERY TIME A REGISTER TIMES OUT ITS ADDRESS WILL BE REPORTED.
                                ;*      AT THE END OF EACH TEST A SUMMARY OF THE ADDRESSES THAT TIMED
                                ;*      OUT DURING THAT TEST IS GIVEN.  THE RESULTS OF ''AND-ING'' AND ''OR-ING''
                                ;*      THEIR ADDRESSES IS GIVEN TO SHOW WHICH ADDRESS LINES MAY BE
                                ;*      STUCK AT 0 OR 1.  THE PAR/PDR ADDRESS AND KT MUX'S ARE THE
                                ;*      THINGS BEING CHECKED.
                                ;*
                                ;;*****************************************************************


                                ;;*****************************************************************
                                ;*TEST 5        SR0,SR1,SR2,SR3 TIMEOUT TEST
                                ;*
                                ;*      THIS TEST ADDRESSES THE MEMORY MANAGEMENT STATUS REGISTERS
                                ;*      0,1,2, AND 3.  STATUS REG. 1 IS NOT USED BUT SHOULD STILL
                                ;*      RESPOND TO ITS UNIBUS ADDRESS.  DATA WILL BE WRITTEN OR READ
                                ;*      FROM THESE REGISTERS IN LATER TESTS, THIS TEST JUST CHECK
                                ;*      FOR A RESPONSE.
                                ;*
                                ;;*****************************************************************
021124  000004                  TST5:   SCOPE

021126  012737  021170  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
021134  012737  021232  000004          MOV     #5$,@#4         ;SET TIMEOUT VECTOR TO 5$
021142  012700  177572                  MOV     #SR0,R0         ;LOAD R0 WITH ADDRESS OF FIRST REG.
021146  012701  000003                  MOV     #3,R1           ;LOAD R1 WITH THE LOOP COUNT
021152  012737  177777  001300          MOV     #-1,ANDADR      ;INITIALIZE ''AND'' OF ADDRS. LOC.
021160  005037  001302                  CLR     ORADR           ;INITIALIZE ''OR'' OF ADDRS. LOC.
021164  005037  001304                  CLR     TONUM           ;INITIALIZE ''TIMEOUTS'' COUNTER
021170  005710                  2$:     TST     (R0)            ;TRY ADDRESSING A STATUS REGISTER
                                                                ;IF IT TIMES OUT GO TO 5$
021172  062700  000002          3$:     ADD     #2,R0           ;PUT NEXT ADDRESS IN R0
021176  077104                  SOB     R1,2$                   ;LOOP BACK TO 2$ UNTIL ALL TESTED
021200  005737  172516                  TST     @#172516        ;CHECK SR3 FOR RESPONSE
                                                                ;IF IT TIMES OUT GO TO 5$
021204  012737  021126  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
021212  005737  001304                  TST     TONUM           ;DID ANY OF THE STATUS REG.S TIMEOUT?
021216  001401                  BEQ     4$                      ;BRANCH IF NO
021220  104010                  ERROR   10                      ;SUMMARY OF STATUS REG. TIMEOUTS
021222  012737  002076  000004  4$:     MOV     #TIMERR,@#4     ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
021230  000414                  BR      TST6                    ;;GO TO NEXT TEST

021232  062706  000004          5$:     ADD     #4,KSP          ;CLEAN UP THE STACK
021236  104007                  ERROR   7                       ;ONE OF THE STATUS REGS. TIMED OUT
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;''BR 2$'' = 000756
021240  010002                  MOV     R0,R2                   ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
021242  050237  001302          BIS     R2,ORADR                ;''OR'' IT WITH OTHER ADDRS. THAT TIMED OUT
021246  005102                  COM     R2                      ;''AND'' IT WITH OTHER ADDRS. THAT TIMED OUT
021250  040237  001300          BIC     R2,ANDADR
021254  005237  001304          INC     TONUM                   ;INCREMENT THE TIMEOUT COUNTER
```

```
1511  021260  000744                          BR      3$              ;BRANCH BACK TO TEST THE NEXT ADDR.
1512
1513                                  ;;*****************************************************************
1514                                  ;*TEST 6         KERNEL PAR'S TIMEOUT TEST
1515                                  ;*
1516                                  ;*      THIS TEST ADDRESSES THE EIGHT (8) KERNEL PAGE ADDRESS
1517                                  ;*      REGISTERS (KIPAR0-KIPAR7) AND CHECKS THAT SOMETHING
1518                                  ;*      RESPONDS TO THEIR ADDRESSES.
1519                                  ;*
1520                                  ;;*****************************************************************
1521  021262  000004                  TST6:   SCOPE
1522
1523  021264  012737  021326  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
1524  021272  012737  021364  000004          MOV     #5$,@#4         ;SET TIMEOUT VECTOR TO 5$
1525  021300  012700  172340                  MOV     #KIPAR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
1526  021304  012701  000010                  MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
1527  021310  012737  177777  001300          MOV     #-1,ANDADR      ;INITIALIZE ''AND'' OF ADDR. LOC
1528  021316  005037  001302                  CLR     ORADR           ;INITIALIZE ''OR'' OF ADDR. LOC.
1529  021322  005037  001304                  CLR     TONUM           ;INITIALIZE ''TIMEOUTS'' COUNTER
1530  021326  005710                  2$:     TST     (R0)            ;TRY ADDRESSING A KIPAR
1531                                                                  ;IF IT TIMES OUT, WILL GO TO 5$
1532  021330  062700  000002          3$:     ADD     #2,R0           ;PUT NEXT KIPAR ADDRESS IN R0
1533  021334  077104                          SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
1534  021336  012737  021264  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1535  021344  005737  001304                  TST     TONUM           ;DID ANY OF THE KIPARS TIME OUT?
1536  021350  001401                          BEQ     4$              ;BRANCH IF NO
1537  021352  104010                          ERROR   10              ;SUMMARY OF KIPAR TIMEOUTS
1538  021354  012737  002076  000004  4$:     MOV     #TIMERR,@#4     ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
1539  021362  000414                          BR      TST7            ;;GO TO NEXT TEST
1540
1541  021364  062706  000004          5$:     ADD     #4,KSP          ;CLEAN UP THE STACK
1542  021370  104007                          ERROR   7               ;ONE OF THE KIPARS TIMED OUT
1543                                                                  ;FOR TIGHTER SCOPE LOOP
1544                                                                  ;REPLACE ERROR CALL WITH
1545                                                                  ;''BR 2$'' = 000756
1546  021372  010002                          MOV     R0,R2           ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
1547  021374  050237  001302                  BIS     R2,ORADR        ;''OR'' IT WITH OTHER ADDRS. THAT TIMED OUT
1548  021400  005102                          COM     R2              ;''AND'' IT WITH OTHER ADDRS. THAT TIMED OUT
1549  021402  040237  001300                  BIC     R2,ANDADR
1550  021406  005237  001304                  INC     TONUM           ;INCREMENT THE TIMEOUT COUNTER
1551  021412  000746                          BR      3$              ;BRANCH BACK TO TEST THE NEXT KIPAR
1552
1553                                  ;;*****************************************************************
1554                                  ;*TEST 7         KERNEL PDR'S TIMEOUT TEST
1555                                  ;*
1556                                  ;*      THIS TEST ADDRESSES THE EIGHT (8) KERNEL PAGE DESCRIPTOR
1557                                  ;*      REGISTERS (KIPDR0-KIPDR7) AND CHECKS THAT SOMETHING
1558                                  ;*      RESPONDS TO THEIR ADDRESSES.
1559                                  ;*
1560                                  ;;*****************************************************************
1561  021414  000004                  TST7:   SCOPE
1562
1563  021416  012737  021460  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
1564  021424  012737  021516  000004          MOV     #5$,@#4         ;SET TIMEOUT VECTOR TO 5$
1565  021432  012700  172300                  MOV     #KIPDR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
1566  021436  012701  000010                  MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
```

```
1567  021442  012737  177777  001300          MOV     #-1,ANDADR      ;INITIALIZE ''AND'' OF ADDR. LOC
1568  021450  005037  001302                  CLR     ORADR           ;INITIALIZE ''OR'' OF ADDR. LOC.
1569  021454  005037  001304                  CLR     TONUM           ;INITIALIZE ''TIMEOUTS'' COUNTER
1570  021460  005710                  2$:     TST     (R0)            ;TRY ADDRESSING A KIPDR
1571                                                                  ;IF IT TIMES OUT, WILL GO TO 5$
1572  021462  062700  000002          3$:     ADD     #2,R0           ;PUT NEXT KIPDR ADDRESS IN R0
1573  021466  077104                          SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
1574  021470  012737  021416  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1575  021476  005737  001304                  TST     TONUM           ;DID ANY OF THE KIPDRS TIME OUT?
1576  021502  001401                          BEQ     4$              ;BRANCH IF NO
1577  021504  104010                          ERROR   10              ;SUMMARY OF KIPDR TIMEOUTS
1578  021506  012737  002076  000004  4$:     MOV     #TIMERR,@#4     ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
1579  021514  000414                          BR      TST10           ;;GO TO NEXT TEST
1580
1581  021516  062706  000004          5$:     ADD     #4,KSP          ;CLEAN UP THE STACK
1582  021522  104007                          ERROR   7               ;ONE OF THE KIPDRS TIMED OUT
1583                                                                  ;FOR TIGHTER SCOPE LOOP
1584                                                                  ;REPLACE ERROR CALL WITH
1585                                                                  ;''BR 2$'' = 000756
1586  021524  010002                          MOV     R0,R2           ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
1587  021526  050237  001302                  BIS     R2,ORADR        ;''OR'' IT WITH OTHER ADDRS. THAT TIMED OUT
1588  021532  005102                          COM     R2              ;''AND'' IT WITH OTHER ADDRS. THAT TIMED OUT
1589  021534  040237  001300                  BIC     R2,ANDADR
1590  021540  005237  001304                  INC     TONUM           ;INCREMENT THE TIMEOUT COUNTER
1591  021544  000746                          BR      3$              ;BRANCH BACK TO TEST THE NEXT KIPDR
1592
1593                                  ;;**************************************************************
1594                                  ;*TEST 10       USER PAR'S TIMEOUT TEST
1595                                  ;*
1596                                  ;*      THIS TEST ADDRESSES THE EIGHT (8) USER PAGE ADDRESS
1597                                  ;*      REGISTERS (UIPAR0-UIPAR7) AND CHECKS THAT SOMETHING
1598                                  ;*      RESPONDS TO THEIR ADDRESSES.
1599                                  ;*
1600                                  ;;**************************************************************
1601  021546  000004                  TST10:  SCOPE
1602
1603  021550  012737  021612  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
1604  021556  012737  021650  000004          MOV     #5$,@#4         ;SET TIMEOUT VECTOR TO 5$
1605  021564  012700  177640                  MOV     #UIPAR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
1606  021570  012701  000010                  MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
1607  021574  012737  177777  001300          MOV     #-1,ANDADR      ;INITIALIZE ''AND'' OF ADDR. LOC
1608  021602  005037  001302                  CLR     ORADR           ;INITIALIZE ''OR'' OF ADDR. LOC.
1609  021606  005037  001304                  CLR     TONUM           ;INITIALIZE ''TIMEOUTS'' COUNTER
1610  021612  005710                  2$:     TST     (R0)            ;TRY ADDRESSING A UIPAR
1611                                                                  ;IF IT TIMES OUT, WILL GO TO 5$
1612  021614  062700  000002          3$:     ADD     #2,R0           ;PUT NEXT UIPAR ADDRESS IN R0
1613  021620  077104                          SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
1614  021622  012737  021550  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1615  021630  005737  001304                  TST     TONUM           ;DID ANY OF THE UIPARS TIME OUT?
1616  021634  001401                          BEQ     4$              ;BRANCH IF NO
1617  021636  104010                          ERROR   10              ;SUMMARY OF UIPAR TIMEOUTS
1618  021640  012737  002076  000004  4$:     MOV     #TIMERR,@#4     ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
1619  021646  000414                          BR      TST11           ;;GO TO NEXT TEST
1620
1621  021650  062706  000004          5$:     ADD     #4,KSP          ;CLEAN UP THE STACK
1622  021654  104007                          ERROR   7               ;ONE OF THE UIPARS TIMED OUT
```

```
1623                                                    ;FOR TIGHTER SCOPE LOOP
1624                                                    ;REPLACE ERROR CALL WITH
1625                                                    ;''BR 2$'' = 000756
1626  021656  010002                    MOV     R0,R2      ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
1627  021660  050237  001302            BIS     R2,ORADR   ;''OR'' IT WITH OTHER ADDRS. THAT TIMED OUT
1628  021664  005102                    COM     R2         ;''AND'' IT WITH OTHER ADDRS. THAT TIMED OUT
1629  021666  040237  001300            BIC     R2,ANDADR
1630  021672  005237  001304            INC     TONUM      ;INCREMENT THE TIMEOUT COUNTER
1631  021676  000746                    BR      3$         ;BRANCH BACK TO TEST THE NEXT UIPAR
1632
1633                          ;;*************************************************************
1634                          ;*TEST 11       USER PDR'S TIMEOUT TEST
1635                          ;*
1636                          ;*      THIS TEST ADDRESSES THE EIGHT (8) USER PAGE DESCRIPTOR
1637                          ;*      REGISTERS (UIPDR0-UIPDR7) AND CHECKS THAT SOMETHING
1638                          ;*      RESPONDS TO THEIR ADDRESSES.
1639                          ;*
1640                          ;;*************************************************************
1641  021700  000004          TST11:  SCOPE
1642
1643  021702  012737  021744  001110  1$:     MOV     #2$,$LPERR ;SET LOOP ON ERROR POINTER TO 2$
1644  021710  012737  022002  000004          MOV     #5$,@#4    ;SET TIMEOUT VECTOR TO 5$
1645  021716  012700  177600                  MOV     #UIPDR0,R0 ;LOAD R0 WITH ADDRESS OF FIRST REG.
1646  021722  012701  000010                  MOV     #10,R1     ;LOAD R1 WITH LOOP COUNT (8)
1647  021726  012737  177777  001300          MOV     #-1,ANDADR ;INITIALIZE ''AND'' OF ADDR. LOC
1648  021734  005037  001302                  CLR     ORADR      ;INITIALIZE ''OR'' OF ADDR. LOC.
1649  021740  005037  001304                  CLR     TONUM      ;INITIALIZE ''TIMEOUTS'' COUNTER
1650  021744  005710                  2$:     TST     (R0)       ;TRY ADDRESSING A UIPDR
1651                                                             ;IF IT TIMES OUT, WILL GO TO 5$
1652  021746  062700  000002          3$:     ADD     #2,R0      ;PUT NEXT UIPDR ADDRESS IN R0
1653  021752  077104                  SOB     R1,2$      ;LOOP BACK TO 2$ UNTIL ALL TESTED
1654  021754  012737  021702  001110          MOV     #1$,$LPERR ;RESET LOOP ON ERROR POINTER TO 1$
1655  021762  005737  001304                  TST     TONUM      ;DID ANY OF THE UIPDRS TIME OUT?
1656  021766  001401                  BEQ     4$         ;BRANCH IF NO
1657  021770  104010                  ERROR   10         ;SUMMARY OF UIPDR TIMEOUTS
1658  021772  012737  002076  000004  4$:     MOV     #TIMERR,@#4 ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
1659  022000  000414                  BR      TST12      ;;GO TO NEXT TEST
1660
1661  022002  062706  000004          5$:     ADD     #4,KSP     ;CLEAN UP THE STACK
1662  022006  104007                  ERROR   7          ;ONE OF THE UIPDRS TIMED OUT
1663                                                             ;FOR TIGHTER SCOPE LOOP
1664                                                             ;REPLACE ERROR CALL WITH
1665                                                             ;''BR 2$'' = 000756
1666  022010  010002                  MOV     R0,R2      ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
1667  022012  050237  001302          BIS     R2,ORADR   ;''OR'' IT WITH OTHER ADDRS. THAT TIMED OUT
1668  022016  005102                  COM     R2         ;''AND'' IT WITH OTHER ADDRS. THAT TIMED OUT
1669  022020  040237  001300          BIC     R2,ANDADR
1670  022024  005237  001304          INC     TONUM      ;INCREMENT THE TIMEOUT COUNTER
1671  022030  000746                  BR      3$         ;BRANCH BACK TO TEST THE NEXT UIPDR
1672
1673                          ;;*************************************************************
1674                          ;*TEST 12       SR0(15:13) BIT TEST & SR2 TEST
1675                          ;*
1676                          ;*      THIS TEST CHECKS BITS <15:13> OF STATUS REGISTER 0 TO SEE
1677                          ;*      THAT EACH CAN BE SET AND CLEARED AND THAT A ''RESET'' WILL
1678                          ;*      CLEAR ALL OF THEM.
```

```
                                ;*      THE REST OF 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.
                                ;*
                                ;;*****************************************************************
022032  000004                 TST12:  SCOPE

022034  012700  177572          1$:     MOV     #SR0,R0         ;LOAD ADDRESS OF SR0 INTO R0
022040  012710  160000                  MOV     #160000,(R0)    ;SET BITS <15:13> IN SR0 (ERROR BITS)
022044  000005                          RESET                   ;ISSUE AND "INIT" SIGNAL
022046  011001                          MOV     (R0),R1         ;READ SR0 INTO R1 TO SEE IF CLEAR
022050  001404                          BEQ     2$              ;BRANCH IF SR0<15:13> CLEARED BY "INIT"
022052  104011                          ERROR   11              ;SR0<15:13> NOT CLEARED BY A 'RESET"
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;'BR 1$" = 000770
022054  012737  022062  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
022062  013737  177576  001274  2$:     MOV     SR2,WASSR2      ;READ CONTENTS OF SR2
022070  012701  022062                  MOV     #2$,R1          ;LOAD EXPECTED CONTENTS INTO R1
022074  020137  001274                  CMP     R1,WASSR2       ;IS SR2 TRACKING?
022100  001401                          BEQ     3$              ;BRANCH IF YES
022102  104041                          ERROR   41              ;SR2 NOT "TRACKING" VIRTUAL ADDRESSES
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;'BR 2$" = 000767
022104  012737  022122  001110  3$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
022112  012701  100000                  MOV     #BIT15,R1       ;PUT DATA TO BE WRITTEN IN R1
022116  012703  000003                  MOV     #3,R3           ;SETUP R3 AS A LOOP COUNTER
022122  005010                  4$:     CLR     (R0)            ;CLEAR SR0
022124  050110                  5$:     BIS     R1,(R0)         ;SET ONE OF THE ERROR BITS IN SR0
022126  011002                          MOV     (R0),R2         ;READ SR0 INTO R2
022130  020102                          CMP     R1,R2           ;DID RIGHT ERROR BIT GET SET?
022132  001401                          BEQ     6$              ;BRANCH IF YES
022134  104012                          ERROR   12              ;BITS WERE SET WRONG IN SR0
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;'BR 4$" = 000772
022136  012704  022124          6$:     MOV     #5$,R4          ;LOAD EXPECTED CONTENTS OF SR2 IN R4
022142  013737  177576  001274          MOV     SR2,WASSR2      ;READ SR2
022150  020437  001274                  CMP     R4,WASSR2       ;DID SR2 LOCK UP WHEN ERROR
                                                                ;BIT SET IN SR1?
022154  001401                          BEQ     7$              ;BRANCH IF YES
022156  104064                          ERROR   64              ;SR2 DID NOT LOCK UP
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;'BR 4$" = 000761
022160  006001                  7$:     ROR     R1              ;CHANGE DATA TO CHECK NEXT ERROR BIT
022162  077321                          SOB     R3,4$           ;LOOP BACK UNTIL <15:13> ALL TESTED
022164  005010                          CLR     (R0)            ;CLEAR SR0 BEFORE LEAVING
022166  012737  022034  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
                                ;*      VERIFYING THAT STATUS REGISTER 0 IS NOT EFFECTED BY WRITING
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                                ;*      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.
                                ;*
                                ;;*****************************************************************
022174  000004                 TST13:  SCOPE

022176  005037  177776         1$:     CLR     PSW             ;CLEAR THE PSW
022202  005037  177572                 CLR     SR0             ;CLEAR STATUS REGISTER 0
022206  106427  000340                 MTPS    #340            ;SET PRIORITY 7 IN LOW BYTE OF PSW
022212  013700  177572                 MOV     SR0,R0          ;READ STATUS REGISTER 0
022216  001401                        BEQ     2$              ;BRANCH IF IT WAS STILL 0
022220  104013                        ERROR   13              ;SR0 EFFECTED BY A WRITE TO THE PSW
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;'BR 1$'' = 000767
022222  005037  177572         2$:     CLR     SR0             ;BE SURE SR0 IS 0 BEFORE LEAVING
022226  005037  177776                 CLR     PSW             ;BE SURE PSW IS 0 BEFORE LEAVING

                                ;;*****************************************************************
                                ;*TEST 14       TEST THAT SR1 READS ALL ZEROS
                                ;*
                                ;*      THIS TESTS CHECKS THAT STATUS REGISTER 1
                                ;*      RESPONDS WITH ALL ZEROS, AND THAT ONLY BITS<5:4>
                                ;*      OF STATUS REGISTER 3 ARE WRITEABLE.
                                ;*
                                ;;*****************************************************************
022232  000004                 TST14:  SCOPE
022234  012700  177777         1$:     MOV     #-1,R0          ;FILL R0 WITH ALL ONES
022240  013700  177574                 MOV     SR1,R0          ;READ SR1 INTO R0
022244  001401                        BEQ     2$              ;BRANCH IF SR1 READS ALL ZEROS
022246  104014                        ERROR   14              ;SR1 DID NOT READ ALL ZEROS
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;000772
022250  012737  177777  172516 2$:     MOV     #-1,SR3         ;TRY TO WRITE ONES TO SR3
022256  022737  000060  172516         CMP     #60,SR3         ;ONLY BITS <5:4> SHOULD BE ONES
022264  001401                        BEQ     3$
022266  104012                        ERROR   12              ;DIDN'T READ BACK A ''60''
022270  000005                 3$:     RESET                   ;CLEARS SR3
022272  005737  172516                 TST     SR3             ;VERIFY THAT IT WAS CLEARED
022276                         4$:
022276  001401                        BEQ     TST15           ;;BRANCH IF SR3 READ ALL ZEROS
022300  104012                        ERROR   12              ;SR3 DIDN'T READ ALL ZEROS


                                ;;*****************************************************************
                                ;*TEST 15       BIT TEST OF KERNEL & USER PAR'S
                                ;*
                                ;*      THE FOLLOWING TEST CHECKS THE BITS <15:00> OF BOTH THE KERNEL
                                ;*      AND USER PAGE ADDRESS REGISTERS.  A ''0'' IS ROTATED THRU
                                ;*      THE REGISTERS FROM LEFT TO RIGHT.
                                ;*
                                ;;*****************************************************************
022302  000004                 TST15:  SCOPE
```

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1791
1792  022304  012700  172340          1$:   MOV   #KIPAR0,R0     ;LOAD ADDRESS OF FIRST PAR IN R0
1793  022310  012703  000010          2$:   MOV   #10,R3         ;SETUP R3 TO COUNT 8 PAR'S
1794  022314  012737  022322  001110        MOV   #3$,$LPERR     ;SET LOOP ON ERROR POINTER TO 3$
1795  022322  005010                  3$:   CLR   (R0)           ;CLEAR THE PAR
1796  022324  011001                        MOV   (R0),R1        ;READ THE PAR INTO R1
1797  022326  001401                        BEQ   4$             ;BRANCH IF PAR CLEARED OK
1798  022330  104011                        ERROR 11             ;PAR WOULD NOT CLEAR
1799                                                             ;FOR TIGHTER SCOPE LOOP
1800                                                             ;REPLACE ERROR CALL WITH
1801                                                             ;'BR 3$' = 000774
1802  022332  012704  077777          4$:   MOV   #077777,R4     ;LOAD 'WALKING 0' TEST PATTERN IN R4
1803  022336  012737  022344  001110        MOV   #5$,$LPERR     ;SET LOOP ON ERROR POINTER TO 5$
1804  022344  005010                  5$:   CLR   (R0)           ;CLEAR THE PAR BEFORE LOADING DATA
1805  022346  050410                        BIS   R4,(R0)        ;BIT SET THE TEST PATTERN INTO THE PAR
1806  022350  011002                        MOV   (R0),R2        ;READ THE PAR INTO R2
1807  022352  020402                        CMP   R4,R2          ;DOES DATA WRITTEN=DATA READ?
1808  022354  001402                        BEQ   6$             ;BRANCH IF YES
1809  022356  010401                        MOV   R4,R1          ;SETUP FOR ERROR REPORTING
1810  022360  104012                        ERROR 12             ;PAR BITS DID NOT SET CORRECTLY
1811                                                             ;FOR TIGHTER SCOPE LOOP
1812                                                             ;REPLACE ERROR CALL WITH
1813                                                             ;'BR 5$' = 000767
1814  022362  000261                  6$:   SEC                  ;SET THE C-BIT FOR THE ROTATE INST.
1815  022364  006004                        ROR   R4             ;ROTATE THE TEST PATTERN IN R4
1816  022366  103766                        BCS   5$             ;BRANCH BACK IF MORE BITS TO TEST
1817  022370  062700  000002                ADD   #2,R0          ;GET NEXT PAR ADDRESS IN R0
1818  022374  077326                        SOB   R3,3$          ;BRANCH BACK UNTIL ALL PAR'S TESTED
1819  022376  022700  177660                CMP   #UIPAR7+2,R0   ;HAVE USER PAR'S BEEN TESTED
1820  022402  103003                        BHIS  7$             ;BRANCH IF YES
1821  022404  012700  177640                MOV   #UIPAR0,R0     ;LOAD FIRST USER PAR ADDR. IN R0
1822  022410  000737                        BR    2$             ;BRANCH BACK TO TEST USER PAR'S
1823  022412  012737  022304  001110  7$:   MOV   #1$,$LPERR     ;RESET LOOP OR ERROR POINTER TO 1$
1824                                                             ;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.
                                ;*
                                ;;*****************************************************************
022420  000004                  TST16:  SCOPE

022422  012700  172300          1$:     MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST PDR IN R0
022426  012703  000010          2$:     MOV     #10,R3          ;SETUP R3 TO COUNT 8 PDR'S
022432  012737  022440  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
022440  005010                  3$:     CLR     (R0)            ;CLEAR THE PDR
022442  011001                          MOV     (R0),R1         ;READ THE PDR INTO R1
022444  001401                          BEQ     4$              ;BRANCH IF PDR CLEARED OK
022446  104011                          ERROR   11              ;PDR WOULD NOT CLEAR
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;"BR 3$" = 000774
022450  012704  077777          4$:     MOV     #077777,R4      ;LOAD "WALKING "0" TEST PATTERN IN R4
022454  012737  022462  001110          MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
022462  005010                  5$:     CLR     (R0)            ;CLEAR THE PDR BEFORE LOADING DATA
022464  010401                          MOV     R4,R1           ;LOAD DATA INTO R1
022466  042701  100361                  BIC     #100361,R1      ;MASK UNUSED BITS OUT OF THE DATA
022472  050110                          BIS     R1,(R0)         ;BIT SET THE TEST PATTERN INTO THE PDR
022474  011002                          MOV     (R0),R2         ;READ THE PDR INTO R2
022476  020102                          CMP     R1,R2           ;DOES DATA WRITTEN=DATA READ?
022500  001401                          BEQ     6$              ;BRANCH IF YES
022502  104012                          ERROR   12              ;PDR BITS DID NOT SET CORRECTLY
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;"BR 5$" = 000767
022504  000261                  6$:     SEC                     ;SET THE C-BIT FOR THE ROTATE INST.
022506  006004                          ROR     R4              ;ROTATE THE TEST PATTERN IN R4
022510  103764                          BCS     5$              ;BRANCH BACK IF MORE BITS TO TEST
022512  062700  000002                  ADD     #2,R0           ;GET NEXT PDR ADDRESS IN R0
022516  077330                          SOB     R3,3$           ;BRANCH BACK UNTIL ALL PDR'S TESTED
022520  022700  177620                  CMP     #UIPDR7+2,R0    ;HAVE USER PDR'S BEEN TESTED?
022524  103003                          BHIS    7$              ;BRANCH IF YES
022526  012700  177600                  MOV     #UIPDR0,R0      ;LOAD FIRST USER PDR ADDR. IN R0
022532  000735                          BR      2$              ;BRANCH BACK TO TEST USER PDR'S
022534  012737  022422  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.
                                ;*
                                ;;*****************************************************************
022542  000004                  TST17:  SCOPE
```

```
 1881
 1882  022544  012700  172340          1$:     MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST PAR INTO R0
 1883  022550  012737  022562  001110  2$:     MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
 1884  022556  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER TO DO 8 PAR'S
 1885  022562  012701  177777          3$:     MOV     #-1,R1          ;LOAD TEST PATTERN INTO R1
 1886  022566  005010                          CLR     (R0)            ;CLEAR THE PAR
```

```
1887  022570  110110                          MOVB    R1,(R0)         ;WRITE 1'S TO THE LOW BYTE OF THE PAR
1888  022572  011002                          MOV     (R0),R2         ;READ THE ENTIRE PAR INTO R2
1889  022574  042701  177400                  BIC     #177400,R1      ;MASK HIGH BYTE & UNUSED BITS OUT OF THE DATA
1890  022600  020102                          CMP     R1,R2           ;WAS ONLY THE LOW BYTE WRITTEN TO
1891  022602  001401                          BEQ     4$              ;BRANCH IF YES
1892  022604  104015                          ERROR   15              ;HIGH BYTE EFFECTED BY WRITING LOW BYTE IN PAR
1893                                                                  ;FOR TIGHTER SCOPE LOOP
1894                                                                  ;REPLACE ERROR CALL WITH
1895                                                                  ;'BR 3$'' = 000766
1896  022606  012737  022614  001110  4$:     MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
1897  022614  005010                  5$:     CLR     (R0)            ;CLEAR THE PAR
1898  022616  012701  177777                  MOV     #-1,R1          ;LOAD TEST, PATTERN INTO R1
1899  022622  110160  000001                  MOVB    R1,1(R0)        ;WRITE 1'S TO THE HIGH BYTE OF THE PAR
1900  022626  011002                          MOV     (R0),R2         ;READ THE ENTIRE PAR INTO R2
1901  022630  042701  000377                  BIC     #000377,R1      ;MASK LOW BYTE
1902  022634  020102                          CMP     R1,R2           ;WAS ONLY THE HIGH BYTE WRITTEN TO?
1903  022636  001401                          BEQ     6$              ;BRANCH IF YES
1904  022640  104015                          ERROR   15              ;LOW BYTE EFFECTED BY WRITING HIGH BYTE IN PAR
1905                                                                  ;FOR TIGHTER SCOPE LOOP
1906                                                                  ;REPLACE ERROR CALL WITH
1907                                                                  ;'BR 5'' = 000765
1908  022642  062700  000002          6$:     ADD     #2,R0           ;PUT ADDRESS OF NEXT PAR IN R0
1909  022646  077333                          SOB     R3,3$           ;BRANCH BACK UNTIL 8 PAR'S TESTED
1910  022650  022700  177660                  CMP     #UIPAR7+2,R0    ;HAVE USER PAR'S BEEN TESTED
1911  022654  103003                          BHIS    7$              ;BRANCH IF YES
1912  022656  012700  177640                  MOV     #UIPAR0,R0      ;LOAD ADDRESS OF FIRST USER PAR IN R0
1913  022662  000732                          BR      2$              ;BRANCH BACK TO TEST USER PAR'S
1914  022664  012737  022544  001110  7$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1915
```

```
                                ;;*****************************************************************
                                ;*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.
                                ;*
                                ;;*****************************************************************
022672  000004                TST20:  SCOPE

022674  012700  172300        1$:     MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST PDR INTO R0
022700  012737  022712  001110 2$:     MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
022706  012703  000010                MOV     #10,R3          ;LOAD LOOP COUNTER TO DO 8 PDR'S
022712  012701  177777        3$:     MOV     #-1,R1          ;LOAD TEST PATTERN INTO R1
022716  005010                        CLR     (R0)            ;CLEAR THE PDR
022720  110110                        MOVB    R1,(R0)         ;WRITE 1'S TO THE LOW BYTE OF THE PDR
022722  011002                        MOV     (R0),R2         ;READ THE ENTIRE PDR INTO R2
022724  042701  177761              BIC     #177761,R1      ;MASK HIGH BYTE & UNUSED BITS OUT OF DATA
022730  020102                        CMP     R1,R2           ;WAS ONLY THE LOW BYTE WRITTEN TO?
022732  001401                        BEQ     4$              ;BRANCH IF YES
022734  104015                        ERROR   15              ;HIGH BYTE EFFECTED BY WRITING LOW BYTE IN PDR
                                                              ;FOR TIGHTER SCOPE LOOP
                                                              ;REPLACE ERROR CALL WITH
                                                              ;'BR 3$'' = 000766
022736  012737  022744  001110 4$:     MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
022744  005010                5$:     CLR     (R0)            ;CLEAR THE PDR
022746  012701  177777                MOV     #-1,R1          ;LOAD TEST PATTERN INTO R1
022752  110160  000001                MOVB    R1,1(R0)        ;WRITE 1'S TO THE HIGH BYTE OF THE PDR
022756  011002                        MOV     (R0),R2         ;READ THE ENTIRE PDR INTO R2
022760  042701  100377              BIC     #100377,R1      ;MASK LOW BYTE & UNUSED BITS OUT OF DATA
022764  020102                        CMP     R1,R2           ;WAS ONLY THE HIGH BYTE WRITTEN TO?
022766  001401                        BEQ     6$              ;BRANCH IF YES
022770  104015                        ERROR   15              ;LOW BYTE EFFECTED BY WRITING HIGH BYTE IN PDR
                                                              ;FOR TIGHTER SCOPE LOOP
                                                              ;REPLACE ERROR CALL WITH
                                                              ;'BR 5$'' = 000765
022772  062700  000002        6$:     ADD     #2,R0           ;PUT ADDRESS OF NEXT PDR IN R0
022776  077333                        SOB     R3,3$           ;BRANCH BACK UNTIL 8 PDR'S TESTED
023000  022700  177620              CMP     #UIPDR7+2,R0    ;HAVE USER PDR'S BEEN TESTED?
023004  103003                        BHIS    7$              ;BRANCH IF YES
023006  012700  177600              MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
023012  000732                        BR      2$              ;BRANCH BACK TO TEST USER PDR'S
023014  012737  022674  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.
                                ;;*****************************************************************
023022  000004                TST21:  SCOPE

023024  012737  023046  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER 2$
023032  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
023036  012700  172300                  MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PDR AND R0
023042  004737  035202                  JSR     PC,SETREG       ;SET ALL BITS IN ALL PAR'S IN PDR'S
023046  012706  001100          2$:     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
023052  005010                          CLR     (R0)            ;CLEAR ONE OF THE KERNEL PDR'S
023054  004737  035274                  JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
023060  012720  177777                  MOV     #-1,(R0)+       ;RESTORE ALL ONES, AND SETUP FOR NEXT PDR
023064  077310                          SOB     R3,2$           ;LOOP TO 2$ UNTIL ALL KERNEL PDR'S CHECKED
023066  012737  023104  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
023074  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
023100  012700  172340                  MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R0
023104  012706  001100          3$:     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
023110  005010                          CLR     (R0)            ;CLEAR ONE OF THE KERNEL PAR'S
023112  004737  035274                  JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
023116  012720  177777                  MOV     #-1,(R0)+       ;RESTORE ALL ONES, AND SETUP FOR NEXT PAR
023122  077310                          SOB     R3,3$           ;LOOP TO 3$ UNTIL ALL KERNEL PAR'S CHECKED
023124  012737  023142  001110          MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
023132  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
023136  012700  177600                  MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
023142  012706  001100          4$:     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
023146  005010                          CLR     (R0)            ;CLEAR ONE OF THE USER PDR'S
023150  004737  035274                  JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
023154  012720  177777                  MOV     #-1,(R0)+       ;RESTORE ALL ONES, AND SETUP FOR NEXT UPDR
023160  077310                          SOB     R3,4$           ;LOOP TO 4$ UNTIL ALL USER PDR'S CHECKED
023162  012737  023200  001110          MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
023170  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
023174  012700  177640                  MOV     #UIPAR0,R0      ;LOAD ADDRESS OF FIRST USER PAR IN R0
023200  012706  001100          5$:     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
023204  005010                          CLR     (R0)            ;CLEAR ONE OF THE USER PAR'S
023206  004737  035274                  JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
```

```
2009  023212  012720  177777          MOV     #-1,(R0)+       ;RESTORE ALL ONES, AND SETUP FOR NEXT UPAR
2010  023216  077310                  SOB     R3,5$           ;LOOP TO 5$ UNTIL ALL USER PAR'S CHECKED
2011  023220  012737  023024  001110  MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
2012
2013                                  ;;*****************************************************************
2014                                  ;*TEST 22       TEST THAT PAR-PDR'S NOT AFFECTED BY RESET
2015                                  ;*
2016                                  ;*      THIS TEST CHECKS TO SEE THAT THE KERNEL OR USER PAR/PDR'S ARE
2017                                  ;*      NOT AFFECTED BY THE EXECUTION OF A 'RESET'' INSTRUCTION.  THE
2018                                  ;*      ''SETREG'' SUBROUTINE IS USED TO SET ALL WRITEABLE BITS TO A ''1'' IN
2019                                  ;*      THE PAR/PDR'S.  THEN THEY ARE READ TO SEE THAT THEY REMAINED
2020                                  ;*      UNCHANGED
2021                                  ;*
2022                                  ;;*****************************************************************
2023  023226  000004                  TST22:  SCOPE
2024
2025
2026  023230  004737  035202          1$:     JSR     PC,SETREG       ;SET ALL BITS IN ALL PAR'S AND PDR'S
2027  023234  000005                          RESET                   ;ISSUE AN ''INIT'' BY EXECUTING A RESET
2028  023236  012700  172300                  MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PDR IN R0
2029  023242  012704  000010                  MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
2030  023246  011001                  2$:     MOV     (R0),R1         ;READ A KERNEL PDR INTO R1
2031  023250  022701  077416                  CMP     #77416,R1       ;ARE ALL THE BITS STILL SET?
2032  023254  001401                          BEQ     3$              ;BRANCH IF YES
2033  023256  104055                          ERROR   55              ;KERNEL PDR AFFECTED BY A RESET
2034                                                                  ;FOR TIGHTER SCOPE LOOP
2035                                                                  ;REPLACE ERROR CALL WITH
2036                                                                  ;''BR 2$'' = 000773
2037  023260  062700  000002  3$:     ADD     #2,R0           ;FORM ADDRESS OF NEXT KERNEL PDR
2038  023264  077410                  SOB     R4,2$           ;LOOP TO 2$ UNTIL ALL KERNEL PDR'S CHECKED
2039  023266  012700  172340          MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R0
2040  023272  012704  000010          MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
2041  023276  011001                  4$:     MOV     (R0),R1         ;READ A KERNEL PAR INTO R1
2042  023300  022701  177777          CMP     #177777,R1      ;ARE ALL THE BITS STILL SET?
2043  023304  001401                  BEQ     5$              ;BRANCH IF YES
2044  023306  104055                  ERROR   55              ;KERNEL PAR AFFECTED BY A RESET
2045                                                          ;FOR TIGHTER SCOPE LOOP
2046                                                          ;REPLACE ERROR CALL WITH
2047                                                          ;''BR 4$'' = 000773
2048  023310  062700  000002  5$:     ADD     #2,R0           ;FORM ADDRESS OF NEXT KERNEL PAR
2049  023314  077410                  SOB     R4,4$           ;LOOP TO 4$ UNTIL ALL KERNEL PAR'S CHECKED
2050  023316  012700  177600          MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
2051  023322  012704  000010          MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
2052  023326  011001                  6$:     MOV     (R0),R1         ;READ A USER PDR INTO R1
2053  023330  022701  077416          CMP     #77416,R1       ;ARE ALL THE BITS STILL SET?
2054  023334  001401                  BEQ     7$              ;BRANCH IF YES
2055  023336  104055                  ERROR   55              ;USER PDR AFFECTED BY A RESET
2056                                                          ;FOR TIGHTER SCOPE LOOP
2057                                                          ;REPLACE ERROR CALL WITH
2058                                                          ;''BR 6$'' = 000773
2059  023340  062700  000002  7$:     ADD     #2,R0           ;FORM ADDRESS OF NEXT USER PDR
2060  023344  077410                  SOB     R4,6$           ;LOOP TO 6$ UNTIL ALL USER PDR'S CHECKED
2061
2062  023346  012700  177640          MOV     #UIPAR0,R0      ;LOAD ADDRESS OF FIRST USER PAR IN R0
2063  023352  012704  000010          MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
2064  023356  011001                  8$:     MOV     (R0),R1         ;READ A USER PAR INTO R1
```

```
2065  023360  022701  177777              CMP     #177777,R1      ;ARE ALL THE BITS STILL SET?
2066  023364  001401                      BEQ     9$              ;BRANCH IF YES
2067  023366  104055                      ERROR   55              ;USER PAR AFFECTED BY A RESET
2068                                                              ;FOR TIGHTER SCOPE LOOP
2069                                                              ;REPLACE ERROR CALL WITH
2070                                                              ;'BR 8$' = 000773
2071  023370  062700  000002      9$:     ADD     #2,R0           ;FORM ADDRESS OF NEXT USER PAR
2072  023374  077410                      SOB     R4,8$           ;LOOP TO 8$ UNTIL ALL USER PAR'S CHECKED
2073
2074
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2095
2096                                    ;;*****************************************************************
2097                                    ;*TEST 23       RELOCATION & ADDER TEST (NO CARRIES)
2098                                    ;*
2099                                    ;*      THE FOLLOWING TEST SETS UP THE KERNEL PAR'S AND PDR'S
2100                                    ;*      FOR THE REST OF THE PROGRAM.  IT THEN USES DIFFERENT
2101                                    ;*      VIRTUAL ADDRESSES AND DIFFERENT VALUES FOR KERNEL PAR 4
2102                                    ;*      TO PUT DIFFERENT PATTERNS AT THE INPUTS OF THE
2103                                    ;*      MEMORY MANAGEMENT ADDER.  THE VALUES ARE SUCH
2104                                    ;*      THAT NO CARRIES ARE GENERATED OUT OF THE ADDER.
2105                                    ;*
2106                                    ;*      THE METHOD USED TO SEE THAT THE RIGHT PHYSICAL BUS ADDRESS
2107                                    ;*      IS FORMED BY THE ADDER IS TO WRITE A PATTERN TO VIRTUAL
2108                                    ;*      LOCATION WITH MEMORY MGMT., AND
2109                                    ;*      THEN READ THAT LOCATION USING THE PHYSICAL ADDRESS THAT SHOULD
2110                                    ;*      HAVE BEEN FORMED TO SEE IF THE TEST PATTERN GOT THEIR.
2111                                    ;*      22-BIT AND 18-BIT ADDRESSING ARE USED.
2112                                    ;*****************************************************************
2113  023376  000004              TST23:  SCOPE
2114
2115  023400  012700  172340      1$:     MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R0
2116  023404  005001                      CLR     R1              ;CLEAR R1
2117  023406  012702  000007              MOV     #7,R2           ;LOAD LOOP COUNTER WITH A 7
2118  023412  010120              2$:     MOV     R1,(R0)+        ;MAP KERNEL PAR'S TO PAGES 0-6 (4K EACH)
2119  023414  062701  000200              ADD     #200,R1
2120  023420  077204                      SOB     R2,2$           ;LOOP UNTIL KIPAR0 - KIPAR6 ARE LOADED
```

```
2121  023422  012710  007600                    MOV     #7600,(R0)      ;MAP KIPAR7 TO THE I/O PAGE
2122  023426  012700  172300                    MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PDR IN R0
2123  023432  012701  077406                    MOV     #77406,R1       ;LOAD PDR DATA INTO R1
2124  023436  012702  000010                    MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
2125  023442  010120                    3$:     MOV     R1,(R0)+        ;MAP ALL 8 PAGES 128 BLOCKS, UPWARD
2126  023444  077202                            SOB     R2,3$           ;       EXPANDABLE, READ/WRITE
2127
2128  023446  012737  023446  001110  4$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
2129  023454  012700  067776                    MOV     #67776,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
2130  023460  012701  107776                    MOV     #107776,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
2131  023464  012702  125250                    MOV     #125250,R2      ;LOAD TEST PATTERN INTO R2
2132  023470  012704  000600                    MOV     #600,R4 ;LOAD R4 WITH PAR VALUE
2133  023474  010437  172350                    MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <15:00>
2134  023500  011037  001176                    MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
2135  023504  052737  000021  177572            BIS     #21,SR0         ;TURN ON MEM. MGNT. 22-BIT ADDRESSING
2136  023512  010211                            MOV     R2,(R1)         ;LOAD 125250 USING ADDER  (PAR4 + VIRT ADDR.)
2137  023514  000005                            RESET                   ;TURN OFF MEMORY MGMT.
2138  023516  011003                            MOV     (R0),R3         ;READ 125250 BACK WITHOUT USING MEM. MGMT.
2139  023520  013710  001176                    MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
2140  023524  020203                            CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
2141                                                                    ;WRITTEN USING MEMORY MANAGEMENT?
2142  023526  001405                            BEQ     5$              ;BRANCH IF YES
2143  023530  010137  001306                    MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
2144  023534  004737  035466                    JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
2145  023540  104017                            ERROR   17              ;TEST LOCATION DID NOT HAVE PATTERN
2146                                                                    ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
2147                                                                    ;APPARENTLY PHYSICAL ADDR. WAS
2148                                                                    ;FORMED WRONG BY ADDERS USING
2149                                                                    ;THE VIRTUAL ADDR. AND KIPAR4
2150                                                                    ;FOR TIGHTER SCOPE LOOP
2151                                                                    ;REPLACE ERROR CALL WITH
2152                                                                    ;'BR 4$'' = 000742
2153  023542                            5$:
2154  023542  012737  023542  001110  6$:     MOV     #6$,$LPERR      ;SET LOOP ON ERROR POINTER TO 6$
2155  023550  012700  067776                    MOV     #67776,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
2156  023554  012701  102576                    MOV     #102576,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
2157  023560  012702  125251                    MOV     #125251,R2      ;LOAD TEST PATTERN INTO R2
2158  023564  012704  000652                    MOV     #652,R4 ;LOAD R4 WITH PAR VALUE
2159  023570  010437  172350                    MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <15:00>
2160  023574  011037  001176                    MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
2161  023600  052737  000021  177572            BIS     #21,SR0         ;TURN ON MEM. MGNT. 22-BIT ADDRESSING
2162  023606  010211                            MOV     R2,(R1)         ;LOAD 125251 USING ADDER  (PAR4 + VIRT ADDR.)
2163  023610  000005                            RESET                   ;TURN OFF MEMORY MGMT.
2164  023612  011003                            MOV     (R0),R3         ;READ 125251 BACK WITHOUT USING MEM. MGMT.
2165  023614  013710  001176                    MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
2166  023620  020203                            CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
2167                                                                    ;WRITTEN USING MEMORY MANAGEMENT?
2168  023622  001405                            BEQ     7$              ;BRANCH IF YES
2169  023624  010137  001306                    MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
2170  023630  004737  035466                    JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
2171  023634  104017                            ERROR   17              ;TEST LOCATION DID NOT HAVE PATTERN
2172                                                                    ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
2173                                                                    ;APPARENTLY PHYSICAL ADDR. WAS
2174                                                                    ;FORMED WRONG BY ADDERS USING
2175                                                                    ;THE VIRTUAL ADDR. AND KIPAR4
2176                                                                    ;FOR TIGHTER SCOPE LOOP
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                                                                        ;REPLACE ERROR CALL WITH
                                                                        ;'BR 6$'' = 000742
023636                                  7$:
023636  012737  023636  001110  8$:     MOV     #8$,$LPERR              ;SET LOOP ON ERROR POINTER TO 8$
023644  012700  067776                  MOV     #67776,R0               ;LOAD PHYSICAL ADDR. PBA INTO R0
023650  012701  105276                  MOV     #105276,R1              ;LOAD VIRTUAL ADDR. VBA INTO R1
023654  012702  125252                  MOV     #125252,R2              ;LOAD TEST PATTERN INTO R2
023660  012704  000625                  MOV     #625,R4 ;LOAD R4 WITH PAR VALUE
023664  010437  172350                  MOV     R4,KIPAR4               ;LOAD KERNEL PAR 4 BITS <15:00>
023670  011037  001176                  MOV     (R0),$TMP0              ;SAVE CONTENTS AT TEST LOCATION
023674  052737  000021  177572          BIS     #21,SR0                 ;TURN ON MEM. MGNT. 22-BIT ADDRESSING
023702  010211                          MOV     R2,(R1)                 ;LOAD 125252 USING ADDER  (PAR4 + VIRT ADDR.)
023704  000005                          RESET                           ;TURN OFF MEMORY MGMT.
023706  011003                          MOV     (R0),R3                 ;READ 125252 BACK WITHOUT USING MEM. MGMT.
023710  013710  001176                  MOV     $TMP0,(R0)              ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
023714  020203                          CMP     R2,R3                   ;WAS SAME PATTERN READ BACK THAT WAS
                                                                        ;WRITTEN USING MEMORY MANAGEMENT?
023716  001405                          BEQ     9$                      ;BRANCH IF YES
023720  010137  001306                  MOV     R1,VIRT1                ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
023724  004737  035466                  JSR     PC,FORMPA               ;GO FORM PHYSICAL ADDRESS FOR TYPING
023730  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$'' = 000742
023732                                  9$:
023732  012737  023732  001110  10$:    MOV     #10$,$LPERR             ;SET LOOP ON ERROR POINTER TO 10$
023740  012700  177776                  MOV     #PSW,R0                 ;LOAD PHYS. ADDR. OF PSW INTO R0
023744  012701  100076                  MOV     #100076,R1              ;LOAD VIRTUAL ADDR. FOR PSW INTO R1
023750  012702  030340                  MOV     #030340,R2              ;LOAD DATA FOR PSW IN R2
023754  012704  007777                  MOV     #7777,R4                ;LOAD R4 WITH PAR VALUE
023760  010437  172350                  MOV     R4,KIPAR4               ;LOAD KERNEL PAR 4 BITS <11:00>
023764  005010                          CLR     (R0)                    ;CLEAR THE PSW
023766  052737  000001  177572          BIS     #BIT0,SR0               ;TURN ON 'MEMORY MANAGEMENT'' (18 BIT ADDRESSING)
023774  010211                          MOV     R2,(R1)                 ;LOAD PSW USING ADDER (PAR4 + VIRT ADDR.)
023776  000005                          RESET                           ;TURN OFF MEM. MGMT (SR0=0)
024000  011003                          MOV     (R0),R3                 ;READ PSW BACK WITHOUT USING MEM. MGMT.
024002  005010                          CLR     (R0)                    ;CLEAR THE PSW
024004  042703  000037                  BIC     #37,R3                  ;MASK T-BIT & CC BITS OUT OF DATA READ
024010  020203                          CMP     R2,R3                   ;WAS PSW WRITTEN?
024012  001405                          BEQ     11$                     ;BRANCH IF YES
024014  010137  001306                  MOV     R1,VIRT1                ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
024020  004737  035466                  JSR     PC,FORMPA               ;GO FORM PHYSICAL ADDR. FOR TYPING
024024  104017                          ERROR   17                      ;PSW DID NOT HAVE DATA THAT IT SHOULD HAVE.
                                                                        ;APPARENTLY PHYS. ADDR. OF PSW WAS
                                                                        ;NOT FORMED BY ADDERS USING THE
                                                                        ;VIRTUAL ADDR. AND KIPAR4
                                                                        ;FOR TIGHTER SCOPE LOOP
                                                                        ;REPLACE ERROR CALL WITH
                                                                        ;'BR 10$'' = 000742
024026  012737  024026  001110  11$:    MOV     #11$,$LPERR             ;SET LOOP ON ERROR POINTER TO 11$
024034  012700  177776                  MOV     #PSW,R0                 ;LOAD PHYS. ADDR. OF PSW INTO R0
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2233  024040  012701  117776           MOV     #117776,R1      ;LOAD VIRTUAL ADDR. FOR PSW INTO R1
2234  024044  012702  030240           MOV     #030240,R2      ;LOAD DATA FOR PSW IN R2
2235  024050  012704  177600           MOV     #177600,R4      ;LOAD R4 WITH PAR VALUE
2236  024054  010437  172350           MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <15:00>
2237  024060  052737  000021  177572   BIS     #21,SR0         ;TURN ON 'MEMORY MANAGEMENT''(22 BIT ADDRESSING)
2238  024066  010211                   MOV     R2,(R1)         ;LOAD PSW USING ADDER (PAR4 + VIRT. ADDR.)
2239  024070  000005                   RESET                   ;TURN OFF MEM. MGMT (SR0=0)
2240  024072  011003                   MOV     (R0),R3         ;READ PSW BACK WITHOUT USING MEM. MGMT.
2241  024074  005010                   CLR     (R0)            ;CLEAR THE PSW
2242  024076  042703  000037           BIC     #37,R3          ;MASK T-BIT & CC BITS OUT OF DATA READ
2243  024102  020203                   CMP     R2,R3           ;WAS PSW WRITTEN?
2244  024104  001405                   BEQ     12$             ;BRANCH IF YES
2245  024106  010137  001306           MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYSICAL ADDR.
2246  024112  004737  035466           JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDR. FOR TYPING
2247  024116  104017                   ERROR   17              ;PSW DID NOT HAVE DATA THAT IT SHOULD
2248                                                           ;HAVE, APPARENTLY PHYS. ADDR. OF PSW WAS
2249                                                           ;NOT FORMED BY ADDERS USING THE
2250                                                           ;VIRTUAL ADDR. AND KIPAR4
2251                                                           ;FOR TIGHTER SCOPE LOOP
2252                                                           ;REPLACE ERROR CALL WITH
2253                                                           ;'BR 11$'' = 000743
2254  024120  012737  023400  001110   12$:    MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2255
2256                          ;;*****************************************************************
2257                          ;*TEST 24       RELOCATION & ADDER TEST (WITH CARRIES)
2258                          ;*
2259                          ;*      THE FOLLOWING TEST USES THE SAME METHOD AS THE PREVIOUS
2260                          ;*      TEST TO VERIFY MEMORY MANAGEMENTS ABILITY TO CONSTRUCT
2261                          ;*      PHYSICAL BUS ADDRESSES USING A VIRTUAL BUS ADDRESS AND THE
2262                          ;*      CONTENTS OF A PAGE ADDRESS REGISTER.  HOWEVER, THE VALUES
2263                          ;*      AND PATTERNS USED IN THIS TEST WILL GENERATE CARRIES
2264                          ;*      AND CHECK 'WRAPAROUND'' TO ADDRESS 000000 BY
2265                          ;*      USING VIRTUAL ADDR. 111400 AND KIPAR4 = 177664.
2266                          ;*      22-BIT ADDRESSING IS USED.
2267                          ;;*****************************************************************
2268  024126  000004          TST24:  SCOPE
2269
2270  024130                  1$:                             ;KERNEL PAR'S AND PDR'S HAVE BEEN
2271                                                          ;SETUP BY THE PREVIOUS TEST
2272  024130  012737  024130  001110   2$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
2273  024136  012700  066476           MOV     #66476,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
2274  024142  012701  114376           MOV     #114376,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
2275  024146  012702  125253           MOV     #125253,R2      ;LOAD TEST PATTERN INTO R2
2276  024152  012704  000521           MOV     #521,R4 ;LOAD R4 WITH PAR VALUE
2277  024156  010437  172350           MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <15:00>
2278  024162  011037  001176           MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
2279  024166  052737  000021  177572   BIS     #21,SR0         ;TURN ON MEM. MGNT. 22-BIT ADDRESSING
2280  024174  010211                   MOV     R2,(R1)         ;LOAD 125253 USING ADDER  (PAR4 + VIRT ADDR.)
2281  024176  000005                   RESET                   ;TURN OFF MEMORY MGMT.
2282  024200  011003                   MOV     (R0),R3         ;READ 125253 BACK WITHOUT USING MEM. MGMT.
2283  024202  013710  001176           MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
2284  024206  020203                   CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
2285                                                          ;WRITTEN USING MEMORY MANAGEMENT?
2286  024210  001405                   BEQ     3$              ;BRANCH IF YES
2287  024212  010137  001306           MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
2288  024216  004737  035466           JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
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                                                        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 2$'' = 000742
024224                                          3$:
024224  012737  024224  001110                  4$:   MOV     #4$,$LPERR        ;SET LOOP ON ERROR POINTER TO 4$
024232  012700  062276                          MOV     #62276,R0               ;LOAD PHYSICAL ADDR. PBA INTO R0
024236  012701  107376                          MOV     #107376,R1              ;LOAD VIRTUAL ADDR. VBA INTO R1
024242  012702  125254                          MOV     #125254,R2              ;LOAD TEST PATTERN INTO R2
024246  012704  000527                          MOV     #527,R4 ;LOAD R4 WITH PAR VALUE
024252  010437  172350                          MOV     R4,KIPAR4               ;LOAD KERNEL PAR 4 BITS <15:00>
024256  011037  001176                          MOV     (R0),$TMP0              ;SAVE CONTENTS AT TEST LOCATION
024262  052737  000021  177572                  BIS     #21,SR0                 ;TURN ON MEM. MGNT. 22-BIT ADDRESSING
024270  010211                                  MOV     R2,(R1)                 ;LOAD 125254 USING ADDER  (PAR4 + VIRT ADDR.)
024272  000005                                  RESET                           ;TURN OFF MEMORY MGMT.
024274  011003                                  MOV     (R0),R3                 ;READ 125254 BACK WITHOUT USING MEM. MGMT.
024276  013710  001176                          MOV     $TMP0,(R0)              ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
024302  020203                                  CMP     R2,R3                   ;WAS SAME PATTERN READ BACK THAT WAS
                                                                                ;WRITTEN USING MEMORY MANAGEMENT?
024304  001405                                  BEQ     5$                      ;BRANCH IF YES
024306  010137  001306                          MOV     R1,VIRT1                ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
024312  004737  035466                          JSR     PC,FORMPA               ;GO FORM PHYSICAL ADDRESS FOR TYPING
024316  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 4$'' = 000742
024320                                          5$:
024320  012737  024320  001110                  6$:   MOV     #6$,$LPERR        ;SET LOOP ON ERROR POINTER TO 6$
024326  012700  062076                          MOV     #62076,R0               ;LOAD PHYSICAL ADDR. PBA INTO R0
024332  012701  104576                          MOV     #104576,R1              ;LOAD VIRTUAL ADDR. VBA INTO R1
024336  012702  125255                          MOV     #125255,R2              ;LOAD TEST PATTERN INTO R2
024342  012704  000553                          MOV     #553,R4 ;LOAD R4 WITH PAR VALUE
024346  010437  172350                          MOV     R4,KIPAR4               ;LOAD KERNEL PAR 4 BITS <15:00>
024352  011037  001176                          MOV     (R0),$TMP0              ;SAVE CONTENTS AT TEST LOCATION
024356  052737  000021  177572                  BIS     #21,SR0                 ;TURN ON MEM. MGNT. 22-BIT ADDRESSING
024364  010211                                  MOV     R2,(R1)                 ;LOAD 125255 USING ADDER  (PAR4 + VIRT ADDR.)
024366  000005                                  RESET                           ;TURN OFF MEMORY MGMT.
024370  011003                                  MOV     (R0),R3                 ;READ 125255 BACK WITHOUT USING MEM. MGMT.
024372  013710  001176                          MOV     $TMP0,(R0)              ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
024376  020203                                  CMP     R2,R3                   ;WAS SAME PATTERN READ BACK THAT WAS
                                                                                ;WRITTEN USING MEMORY MANAGEMENT?
024400  001405                                  BEQ     7$                      ;BRANCH IF YES
024402  010137  001306                          MOV     R1,VIRT1                ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
024406  004737  035466                          JSR     PC,FORMPA               ;GO FORM PHYSICAL ADDRESS FOR TYPING
024412  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
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2345                                                    ;THE VIRTUAL ADDR. AND KIPAR4
2346                                                    ;FOR TIGHTER SCOPE LOOP
2347                                                    ;REPLACE ERROR CALL WITH
2348                                                    ;'BR 6$'' = 000742
2349  024414                                7$:
2350  024414  012737  024414  001110  8$:   MOV   #3$,$LPERR    ;SET LOOP ON ERROR POINTER TO 8$
2351  024422  012700  000000               MOV   #00000,R0     ;LOAD PHYSICAL ADDR. PBA INTO R0
2352  024426  012701  111400               MOV   #111400,R1    ;LOAD VIRTUAL ADDR. VBA INTO R1
2353  024432  012702  125256               MOV   #125256,R2    ;LOAD TEST PATTERN INTO R2
2354  024436  012704  177664               MOV   #177664,R4    ;LOAD R4 WITH PAR VALUE
2355  024442  010437  172350               MOV   R4,KIPAR4     ;LOAD KERNEL PAR 4 BITS <15:00>
2356  024446  011037  001176               MOV   (R0),$TMP0    ;SAVE CONTENTS AT TEST LOCATION
2357  024452  052737  000021  177572       BIS   #21,SR0       ;TURN ON MEM. MGNT. 22-BIT ADDRESSING
2358  024460  010211                       MOV   R2,(R1)       ;LOAD 125256 USING ADDER  (PAR4 + VIRT ADDR.)
2359  024462  000005                       RESET               ;TURN OFF MEMORY MGMT.
2360  024464  011003                       MOV   (R0),R3       ;READ 125256 BACK WITHOUT USING MEM. MGMT.
2361  024466  013710  001176               MOV   $TMP0,(R0)    ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
2362  024472  020203                       CMP   R2,R3         ;WAS SAME PATTERN READ BACK THAT WAS
2363                                                          ;WRITTEN USING MEMORY MANAGEMENT?
2364  024474  001405                       BEQ   9$            ;BRANCH IF YES
2365  024476  010137  001306               MOV   R1,VIRT1      ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
2366  024502  004737  035466               JSR   PC,FORMPA     ;GO FORM PHYSICAL ADDRESS FOR TYPING
2367  024506  104017                       ERROR 17            ;TEST LOCATION DID NOT HAVE PATTERN
2368                                                          ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
2369                                                          ;APPARENTLY PHYSICAL ADDR. WAS
2370                                                          ;FORMED WRONG BY ADDERS USING
2371                                                          ;THE VIRTUAL ADDR. AND KIPAR4
2372                                                          ;FOR TIGHTER SCOPE LOOP
2373                                                          ;REPLACE ERROR CALL WITH
2374                                                          ;'BR 8$'' = 000742
2375  024510                                9$:
2376  024510  012737  024130  001110       MOV   #1$,$LPERR    ;RESET LOOP ON ERROR POINTER TO 1$
2377
2378                                        ;;*****************************************************************
2379                                        ;*TEST 25       READ AND WRITE WHILE IN RELOCATE MODE
2380                                        ;*
2381                                        ;*      THE FOLLOWING TEST TURNS ON MEMORY MANAGEMENT AND THEN
2382                                        ;*      READS AND WRITES LOCATIONS BETWEEN PHYSICAL ADDRESSES
2383                                        ;*      060000-067600.  ONE LOCATION IN EVERY BLOCK (32. WORDS)
2384                                        ;*      IS WRITTEN USING PAR4 AND READ USING PAR5.  THIS IS
2385                                        ;*      DONE IN BOTH USER AND KERNEL MODES.  THE USER PAR/PDR'S
2386                                        ;*      ARE SETUP AT THE BEGINNING OF THE TEST AND ONCE MEMORY
2387                                        ;*      MANAGEMENT IS TURNED ON IT IS LEFT ON FOR THE REST OF THE
2388                                        ;*      OF THE PROGRAM.  THE 'MODE'' INPUT TO THE PAR/PDR ADDRESS MUX
2389                                        ;*      IS CHECKED BY READING AND WRITING IN USER MODE.  REMEMBER
2390                                        ;*      ALSO, THAT SINCE MEMORY MANAGEMENT IS ON (IN RELOCATE
2391                                        ;*      MODE) THE PROGRAM ITSELF IS USING ITS VIRTUAL ADDRESSES AND
2392                                        ;*      THE PAR/PDR'S TO EXECUTE.
2393                                        ;*
2394                                        ;*      WHILE TESTING IN KERNEL MODE, USER PAGES 4 & 5 ARE MAPPED
2395                                        ;*      NON-RESIDENT WITH DIFFERENT PAR VALUES THAN THE KERNEL
2396                                        ;*      PAR'S TO BE SURE THAT THE KERNEL PAR'S AND PDR'S ARE BEING
2397                                        ;*      USED WHEN IN KERNEL MODE (AND VICE VERSA WHILE TESTING IN
2398                                        ;*      USER MODE).  IF A MEM. MGMT. TRAP OCCURS, THE PROGRAM GOES
2399                                        ;*      TO 9$ WHERE THE TRAP IS REPORTED.
2400                                        ;*
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                                ;*      BY SETTING THE LOCATION $MADR1 IN THE E-TABLE TO A CONSTANT,
                                ;*      AS DESCRIBED IN THE DOCUMENTATION, THIS TEST WILL CONTINUE
                                ;*      ACCESSING LOCATIONS THROUGHOUT MEMORY BY INCREASING THE VALUE
                                ;*      OF PAR4 AND PAR5.
                                ;;*****************************************************************
024516  000004                 TST25:  SCOPE

024520  005037  177776          1$:     CLR     PSW             ;START IN KERNEL MODE
024524  012704  000577                  MOV     #577,R4         ;LOAD R4 WITH VALUE FOR PAR4
024530  012705  000600                  MOV     #600,R5         ;LOAD R5 WITH VALUE FOR PAR5
024534  010437  172350                  MOV     R4,KIPAR4       ;LOAD KERNEL PAR4
024540  010537  172352                  MOV     R5,KIPAR5       ;LOAD KERNEL PAR5
024544  012700  177640                  MOV     #UIPAR0,R0      ;LOAD ADDRESS OF FIRST USER PAR IN R0
024550  005001                          CLR     R1              ;CLEAR R1
024552  012702  000007                  MOV     #7,R2           ;LOAD LOOP COUNTER WITH A 7
024556  010120                  2$:     MOV     R1,(R0)+        ;MAP USER PAR'S TO PAGES 0-6 (4K EACH)
024560  062701  000200                  ADD     #200,R1
024564  077204                          SOB     R2,2$           ;LOOP UNTIL UIPAR0-UIPAR6 ARE LOADED
024566  012710  177600                  MOV     #177600,(R0)    ;MAP USER PAR7 TO THE I/O PAGE
024572  012700  177600                  MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
024576  012701  077406                  MOV     #77406,R1       ;LOAD PDR DATA INTO R1
024602  012702  000010                  MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
024606  010120                  3$:     MOV     R1,(R0)+        ;MAP ALL 8 PAGES 128 BLOCKS, UPWARD
024610  077202                          SOB     R2,3$           ;       EXPANDABLE, READ/WRITE
024612  012737  024672  001110        MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
024620  012737  025156  000250        MOV     #9$,MMVEC       ;SET M. M. TRAP VECTOR TO 9$
024626  012737  000021  177572        MOV     #21,SR0         ;TURN ON MEMORY MANAGEMENT(22-BIT ADDRESSING)
024634  105037  177610          10$:    CLRB    UIPDR4          ;MAP USER SPACE NON-RESIDENT WHILE
024640  105037  177612                  CLRB    UIPDR5          ;       TESTING KERNEL SPACE
024644  010537  177650                  MOV     R5,UIPAR4       ;MAP USER PAR'S OPPOSITE OF KIPAR'S
024650  010437  177652                  MOV     R4,UIPAR5
024654  013737  177776  001176  4$:     MOV     PSW,$TMP0       ;SAVE PSW IN CASE OF ERROR
024662  012700  100100                  MOV     #100100,R0      ;PUT VIRTUAL ADDR. THAT USER PAR4 IN R0
024666  012701  120000                  MOV     #120000,R1      ;PUT VIRTUAL ADDR. THAT USES PAR5 IN R1
024672  010010                  5$:     MOV     R0,(R0)         ;WRITE TO TEST LOC. USING PAR4
024674  011102                          MOV     (R1),R2         ;READ THE SAME LOC., BUT USING PAR5
024676  020002                          CMP     R0,R2           ;DID WE READ WHAT WE WROTE?
024700  001411                          BEQ     6$              ;BRANCH IF YES
024702  010137  001310                  MOV     R1,VIRT2        ;SAVE VIRTUAL ADDR. THAT SELECTED PAR5
024706  010037  001306                  MOV     R0,VIRT1        ;SAVE VIRTUAL ADDR. THAT SELECTED PAR4
024712  004737  035466                  JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS  BEING USED
024716  104020                          ERROR   20              ;READING LOC. USING PAR5 AND A VIRT.
                                                                ;ADDR. DID NOT FIND DATA WRITTEN WHEN USING
                                                                ;PAR4 AND VIRT. ADDRESS.
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;'BR 5$'' = 000765
024720  013700  001306                  MOV     VIRT1,R0        ;RESTORE VBA IN R0
024724  062700  000100          6$:     ADD     #100,R0         ;CHANGE VIRTUAL ADDRS. TO POINT TO NEXT BLOCK
024730  062701  000100                  ADD     #100,R1
024734  020127  127700                  CMP     R1,#127700      ;WERE BLOCKS FROM 60000-676000 ALL TRIED?
024740  001354                          BNE     5$              ;BRANCH IF NO
024742  032737  140000  177776          BIT     #140000,PSW     ;HAVE WE DONE TEST IN USER MODE YET?
024750  001026                          BNE     7$              ;BRANCH IF YES
024752  010437  177650                  MOV     R4,UIPAR4       ;LOAD USER PAR4
024756  010537  177652                  MOV     R5,UIPAR5       ;LOAD USER PAR5
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```
2457  024762  112737  000006  177610          MOVB    #6,UIPDR4       ;MAP USER SPACE R/W TO TEST IT
2458  024770  112737  000006  177612          MOVB    #6,UIPDR5
2459  024776  105037  172310                  CLRB    KIPDR4          ;MAP  KERNEL SPACE NON-RESIDENT WHILE
2460  025002  105037  172312                  CLRB    KIPDR5          ;       TESTING USER SPACE
2461  025006  010537  172350                  MOV     R5,KIPAR4       ;MAP KERNEL PAR'S OPPOSITE UIPAR'S
2462  025012  010437  172352                  MOV     R4,KIPAR5
2463  025016  012737  140000  177776          MOV     #140000,PSW     ;GO TO USER MODE
2464  025024  000713                          BR      4$              ;GO BACK AND READ/WRITE IN USER MODE
2465  025026  005037  177776          7$:     CLR     PSW             ;GO BACK TO KERNEL MODE BEFORE LEAVING
2466
2467  025032  020537  001260                  CMP     R5,@#$MADR1     ;HAVE WE CHECKED ALL MEMORY?
2468  025036  002020                          BGE     8$              ;BRANCH IF YES
2469  025040  062704  000200                  ADD     #200,R4         ;LOAD WITH NEXT VALUE FOR PAR4
2470  025044  062705  000200                  ADD     #200,R5         ;LOAD WITH NEXT VALUE FOR PAR5
2471  025050  010437  172350                  MOV     R4,KIPAR4       ;LOAD KERNAL PAR4
2472  025054  010537  172352                  MOV     R5,KIPAR5       ;LOAD KERNAL PAR5
2473  025060  112737  000006  172310          MOVB    #6,KIPDR4       ;MAP KERNAL SPACE R/W WHILE TESTING
2474  025066  112737  000006  172312          MOVB    #6,KIPDR5
2475  025074  000137  024634                  JMP     10$             ;CONTINUE TEST
2476
2477  025100  012737  077406  172310  8$:     MOV     #77406,KIPDR4   ;REMAP KERNEL PAGES READ/WRITE
2478  025106  012737  077406  172312          MOV     #77406,KIPDR5
2479  025114  012705  000600                  MOV     #600,R5
2480  025120  010537  172350                  MOV     R5,KIPAR4       ;MAP KERNEL  AND USER PAR'S 4 & 5
2481  025124  010537  172352                  MOV     R5,KIPAR5       ;  BACK TO 12-16K
2482  025130  010537  177650                  MOV     R5,UIPAR4
2483  025134  010537  177652                  MOV     R5,UIPAR5
2484  025140  012737  002150  000250          MOV     #MGMERR,MMVEC   ;RESTORE ADDR. OF NORMAL M.M. TRAP ROUTINE
2485  025146  012737  024520  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2486  025154  000427                          BR      TST26           ;;GO TO NEXT TEST
2487
2488  025156  012637  001266          9$:     MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
2489  025162  012637  001270                  MOV     (KSP)+,TRAPPS
2490                                                                  ;PROGRAM WILL TRAP TO HERE IF TRY
2491                                                                  ;TO USE USER PDR'S WHEN IN KERNEL MODE
2492                                                                  ;OR KERNEL PDR'S WHEN IN USER MODE
2493  025166  010037  001306                  MOV     R0,VIRT1        ;SAVE VIRTUAL ADDRESS FOR ERROR REPORT
2494  025172  004737  035466                  JSR     PC,FORMPA       ;GO FORM THE PHYSICAL ADDRESS  BEING USED
2495  025176  013737  177572  001272          MOV     SR0,WASSR0      ;SAVE SR0 & SR2  FOR ERROR REPORT
2496  025204  013737  177576  001274          MOV     SR2,WASSR2
2497  025212  042737  160000  177572          BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
2498  025220  104052                          ERROR   52              ;M.M. TRAP WHILE IN RELOCATE MODE -
2499                                                                  ;REFERENCED WRONG SET OF PDR'S
2500                                                                  ;FOR TIGHTER SCOPE LOOP
2501                                                                  ;REPLACE ERROR CALL WITH
2502                                                                  ;A 'NOP' = 000240
2503  025222  013746  001270                  MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
2504  025226  013746  001266                  MOV     TRAPPC,-(KSP)
2505  025232  000002                          RTI                     ;RETURN TO TEST
2506
2507
2508                                  ;;**************************************************************
2509                                  ;*TEST 26       W-BIT LOGIC TEST, KERNEL PDR'S
2510                                  ;*
2511                                  ;*      THIS TEST WRITES TO EIGHT (8) DIFFERENT VIRTUAL ADDRESSES
2512                                  ;*      (VBA'S = 17776,37776,57776,77776,117776,137776,157776, & 177776
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2513                                    ;*      & PBA'S CONSTRUCTED = 17776.37776,57776,77776,77776,
2514                                    ;*      77776,77776, & 777776 RESPECTIVELY).
2515                                    ;*      WHICH SHOULD CAUSE THE 'W-BIT' TO SET IN EACH OF THE
2516                                    ;*      EIGHT (8) KERNEL PAGE DESCRIPTOR REGISTERS.  THE PDR'S
2517                                    ;*      ARE CHECKED TO SEE THAT IT'S W-BIT DOES SET WHEN THE
2518                                    ;*      PAGE IT IS MAPPED TO IS WRITTEN TO AND THAT THE W-BIT
2519                                    ;*      DOES NOT SET IN ANY OF THE OTHER PDR'S.  KERNEL PDR'S 3,4,5,6
2520                                    ;*      ARE MAPPED TO 12-16K FOR THIS TEST.  ALSO THE W-BIT
2521                                    ;*      SHOULD BE CLEARED WHEN THE PDR IS WRITTEN TO.  THE
2522                                    ;*      W-BIT PORTION OF THE PDR'S IS BEING CHECKED.
2523                                    ;;*****************************************************************
2524  025234  000004                   TST26:  SCOPE
2525  025236                           1$:
2526  025236  004737  035114                   JSR     PC,TOFF         ;TURN T-BIT TRAPPING OFF FOR THIS TEST
2527  025242  012702  000004                   MOV     #4,R2           ;SET LOOP COUNTER TO 4
2528  025246  012700  172346                   MOV     #KIPAR3,R0      ;LOAD ADDRESS OF PAR3 INTO R0
2529  025252  012701  000600                   MOV     #600,R1         ;LOAD ''12-16K'' PAR VALUE INTO R1
2530  025256  010120                   2$:     MOV     R1,(R0)+        ;MAP PARS 3-6 TO 12-16K
2531  025260  077202                           SOB     R2,2$           ;LOOP TIL ALL 4 OF THEM LOADED
2532  025262  012705  172300                   MOV     #KIPDR0,R5      ;LOAD ADDRESS OF FIRST PDR TO BE TESTED IN R5
2533  025266  012704  000010                   MOV     #10,R4          ;SET LOOP COUNTER TO 8
2534  025272  012703  017776                   MOV     #17776,R3       ;INITIALIZE VIRTUAL ADDRESS TO BE IN R3
2535  025276  012737  025304  001110           MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
2536  025304  012700  172300           3$:     MOV     #KIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE SETUP IN R0
2537  025310  012702  000010                   MOV     #10,R2          ;SET LOOP COUNTER TO 8
2538  025314  012701  077406                   MOV     #77406,R1       ;PUT ''W-BIT OFF DATA'' INTO R1
2539  025320  010120                   4$:     MOV     R1,(R0)+        ;CLEAR ALL W-BITS BY WRITING TO ALL PDRS
2540  025322  077202                           SOB     R2,4$           ;LOOP UNTIL ALL OF THEM SETUP
2541  025324  011313                           MOV     (R3),(R3)       ;DO ''DATO'' TO VIRTUAL ADDR.-SETTING A W-BIT
2542  025326  031527  000100                   BIT     (R5),#WBIT      ;DID THAT CAUSE W-BIT TO BE SET?
2543  025332  001002                           BNE     5$              ;BRANCH IF YES
2544  025334  104021                           ERROR   21              ;W-BIT DID NOT GET SET IN PDR
2545                                                                   ;FOR TIGHTER SCOPE LOOP
2546                                                                   ;REPLACE ERROR CALL WITH
2547                                                                   ;''BR 3$'' = 000763
2548  025336  000422                           BR      8$              ;SKIP CHECKING OTHER PDR'S-ERROR WILL SET W-BITS
2549  025340  012702  000010           5$:     MOV     #10,R2          ;SET LOOP COUNTER TO 8
2550  025344  012700  172300                   MOV     #KIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE CHECKED IN R0
2551  025350  031027  000100           6$:     BIT     (R0),#WBIT      ;DID W-BIT IN OTHER PDRS REMAIN CLEAR?
2552  025354  001403                           BEQ     7$              ;BRANCH IF YES
2553  025356  020500                           CMP     R5,R0           ;IF W-BIT SET, THEN WAS IT PDR UNDER TEST?
2554  025360  001401                           BEQ     7$              ;BRANCH IF YES
2555  025362  104022                           ERROR   22              ;W-BIT GOT SET IN MORE THAN ONE PDR
2556                                                                   ;FOR TIGHTER SCOPE LOOP
2557                                                                   ;REPLACE ERROR CALL WITH
2558                                                                   ;''BR 3$'' = 000750
2559  025364  062700  000002           7$:     ADD     #2,R0           ;POINT R0 TO NEXT PDR TO BE CHECKED
2560  025370  077211                           SOB     R2,6$           ;LOOP UNTIL ALL 8 CHECKED FOR CLEAR W-BIT
2561  025372  010115                           MOV     R1,(R5)         ;WRITE TO THE PDR TESTED TO CLEAR W-BIT
2562  025374  031527  000100                   BIT     (R5),#WBIT      ;DID WRITING PDR CLEAR THE W-BIT?
2563  025400  001401                           BEQ     8$              ;BRANCH IF YES
2564  025402  104023                           ERROR   23              ;W-BIT DID NOT CLEAR BY WRITING THE PDR
2565                                                                   ;FOR TIGHTER SCOPE LOOP
2566                                                                   ;REPLACE ERROR CALL WITH
2567                                                                   ;''BR 3$'' = 000740
2568  025404  062705  000002           8$:     ADD     #2,R5           ;POINT R5 TO THE NEXT PDR TO BE TESTED
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2569  025410  062703  020000                  ADD     #20000,R3       ;CHANGE VIRT. ADDR TO REF. NEXT PDR
2570  025414  077445                          SOB     R4,3$           ;LOOP BACK TO 3$ UNTIL ALL 8 PDR'S TESTED
2571  025416  012737  025236  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2572  025424  004737  035150                  JSR     PC,TON          ;TURN T-BIT BACK ON FOR NEXT TEST
2573
2574                                  ;;*****************************************************************
2575                                  ;*TEST 27        W-BIT LOGIC TEST, USER PDR'S
2576                                  ;*
2577                                  ;*      THIS TEST WRITES TO EIGHT (8) DIFFERENT VIRTUAL ADDRESSES
2578                                  ;*      (VBA'S = 17776,37776,57776,77776,117776,137776,157776, & 177776
2579                                  ;*      & PBA'S CONSTRUCTED = 17776,37776,57776,77776,77776,
2580                                  ;*      77776,77776, & 777776 RESPECTIVELY).
2581                                  ;*      WHICH SHOULD CAUSE THE 'W-BIT'' TO SET IN EACH OF THE
2582                                  ;*      EIGHT (8) USER PAGE DESCRIPTOR REGISTERS.  THE PDR'S
2583                                  ;*      ARE CHECKED TO SEE THAT IT'S W-BIT DOES SET WHEN THE
2584                                  ;*      PAGE IT IS MAPPED TO IS WRITTEN TO AND THAT THE W-BIT
2585                                  ;*      DOES NOT SET IN ANY OF THE OTHER PDR'S.  USER PDR'S 3,4,5,6
2586                                  ;*      ARE MAPPED TO 12-16K FOR THIS TEST.  ALSO THE W-BIT
2587                                  ;*      SHOULD BE CLEARED WHEN THE PDR IS WRITTEN TO.  THE
2588                                  ;*      W-BIT PORTION OF THE PDR'S IS BEING CHECKED.
2589                                  ;;*****************************************************************
2590  025430  000004                  TST27:  SCOPE
2591  025432  012737  140000  177776  1$:     MOV     #140000,PSW     ;GO TO USER MODE FOR THIS TEST
2592  025440  004737  035114                  JSR     PC,TOFF         ;TURN T-BIT TRAPPING OFF FOR THIS TEST
2593  025444  012702  000004                  MOV     #4,R2           ;SET LOOP COUNTER TO 4
2594  025450  012700  177646                  MOV     #UIPAR3,R0      ;LOAD ADDRESS OF PAR3 INTO R0
2595  025454  012701  000600                  MOV     #600,R1         ;LOAD ''12-16K'' PAR VALUE INTO R1
2596  025460  010120                  2$:     MOV     R1,(R0)+        ;MAP PARS 3-6 TO 12-16K
2597  025462  077202                          SOB     R2,2$           ;LOOP TIL ALL 4 OF THEM LOADED
2598  025464  012705  177600                  MOV     #UIPDR0,R5      ;LOAD ADDRESS OF FIRST PDR TO BE TESTED IN R5
2599  025470  012704  000010                  MOV     #10,R4          ;SET LOOP COUNTER TO 8
2600  025474  012703  017776                  MOV     #17776,R3       ;INITIALIZE VIRTUAL ADDRESS TO BE IN R3
2601  025500  012737  025506  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
2602  025506  012700  177600          3$:     MOV     #UIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE SETUP IN R0
2603  025512  012702  000010                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
2604  025516  012701  077406                  MOV     #77406,R1       ;PUT 'W-BIT OFF DATA'' INTO R1
2605  025522  010120                  4$:     MOV     R1,(R0)+        ;CLEAR ALL W-BITS BY WRITING TO ALL PDRS
2606  025524  077202                          SOB     R2,4$           ;LOOP UNTIL ALL OF THEM SETUP
2607  025526  011313                          MOV     (R3),(R3)       ;DO ''DATO'' TO VIRTUAL ADDR.-SETTING A W-BIT
2608  025530  031527  000100                  BIT     (R5),#WBIT      ;DID THAT CAUSE W-BIT TO BE SET?
2609  025534  001002                          BNE     5$              ;BRANCH IF YES
2610  025536  104021                          ERROR   21              ;W-BIT DID NOT GET SET IN PDR
2611                                                                  ;FOR TIGHTER SCOPE LOOP
2612                                                                  ;REPLACE ERROR CALL WITH
2613                                                                  ;''BR 3$'' = 000763
2614  025540  000422                          BR      8$              ;SKIP CHECKING OTHER PDR'S-ERROR WILL SET W-BITS
2615  025542  012702  000010          5$:     MOV     #10,R2          ;SET LOOP COUNTER TO 8
2616  025546  012700  177600                  MOV     #UIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE CHECKED IN R0
2617  025552  031027  000100          6$:     BIT     (R0),#WBIT      ;DID W-BIT IN OTHER PDRS REMAIN CLEAR?
2618  025556  001403                          BEQ     7$              ;BRANCH IF YES
2619  025560  020500                          CMP     R5,R0           ;IF W-BIT SET, THEN WAS IT PDR UNDER TEST?
2620  025562  001401                          BEQ     7$              ;BRANCH IF YES
2621  025564  104022                          ERROR   22              ;W-BIT GOT SET IN MORE THAN ONE PDR
2622                                                                  ;FOR TIGHTER SCOPE LOOP
2623                                                                  ;REPLACE ERROR CALL WITH
2624                                                                  ;''BR 3$'' = 000750
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2625  025566  062700  000002          7$:     ADD     #2,R0           ;POINT R0 TO NEXT PDR TO BE CHECKED
2626  025572  077211                          SOB     R2,6$           ;LOOP UNTIL ALL 8 CHECKED FOR CLEAR W-BIT
2627  025574  010115                          MOV     R1,(R5)         ;WRITE TO THE PDR TESTED TO CLEAR W-BIT
2628  025576  031527  000100                  BIT     (R5),#WBIT      ;DID WRITING PDR CLEAR THE W-BIT?
2629  025602  001401                          BEQ     8$              ;BRANCH IF YES
2630  025604  104023                          ERROR   23              ;W-BIT DID NOT CLEAR BY WRITING THE PDR
2631                                                                  ;FOR TIGHTER SCOPE LOOP
2632                                                                  ;REPLACE ERROR CALL WITH
2633                                                                  ;'BR 3$'' = 000740
2634  025606  062705  000002          8$:     ADD     #2,R5           ;POINT R5 TO THE NEXT PDR TO BE TESTED
2635  025612  062703  020000                  ADD     #20000,R3       ;CHANGE VIRT. ADDR TO REF. NEXT PDR
2636  025616  077445                          SOB     R4,3$           ;LOOP BACK TO 3$ UNTIL ALL 8 PDR'S TESTED
2637  025620  012737  025432  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2638  025626  004737  035150                  JSR     PC,TON          ;TURN T-BIT BACK ON FOR NEXT TEST
2639  025632  005037  177776                  CLR     PSW             ;BACK TO KERNEL MODE BEFORE LEAVING
2640
2641                                  ;;*****************************************************************
2642                                  ;*TEST 30       TEST 'W-BIT'' SPECIAL CASES
2643                                  ;*
2644                                  ;*     THIS TEST CHECKS TWO SPECIAL CASES OF THE W-BIT. FIRST CASE IS
2645                                  ;*     THAT THE W-BIT SHOULD NOT SET IN PDR 7 WHEN WRITING TO
2646                                  ;*     STATUS REG SR0 (KERNEL PDR 7 IS USED).  SECOND CASE IS THAT
2647                                  ;*     THE W-BIT IS STILL SET IF THE 'DATO'' IS ABORTED DUE TO A
2648                                  ;*     TIMEOUT ERROR (KERNEL PDR6 & VIRTUAL ADDR 140000 ARE USED).
2649                                  ;*
2650                                  ;;*****************************************************************
2651  025636  000004                  TST30:  SCOPE
2652
2653  025640  004737  035114          1$:     JSR     PC,TOFF         ;TURN OFF T-BIT TRAPPING FOR THIS TEST
2654  025644  012701  077406                  MOV     #77406,R1       ;PUT 'W-BIT OFF'' VALUE FOR PDR IN R1
2655  025650  012737  025656  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
2656  025656  010137  172316          2$:     MOV     R1,KIPDR7       ;LOAD KERNEL PDR 7 TO CLEAR W-BIT
2657  025662  013700  177572                  MOV     SR0,R0          ;READ PRESENT CONTENTS OF STATUS REG. 0
2658  025666  010037  177572                  MOV     R0,SR0          ;WRITE PRESENT CONTENTS OF SR0 BACK TO ITSELF
2659  025672  013702  172316                  MOV     KIPDR7,R2       ;READ CONTENTS OF KIPDR7 INTO R2
2660  025676  020102                          CMP     R1,R2           ;WAS W-BIT LEFT CLEARED?
2661  025700  001401                          BEQ     3$              ;BRANCH IF YES
2662  025702  104024                          ERROR   24              ;W-BIT IN KIPDR7 SET WHEN SR0 WAS WRITTEN TO
2663                                                                  ;FOR TIGHTER SCOPE LOOP
2664                                                                  ;REPLACE ERROR CALL WITH
2665                                                                  ;'BR 2$'' = 000765
2666  025704  012737  025704  001110  3$:     MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
2667  025712  010137  172314                  MOV     R1,KIPDR6       ;LOAD KERNEL PDR6 WITH 77406 TO CLEAR W-BIT
2668  025716  012737  025730  000004          MOV     #4$,ERRVEC      ;SET UP LOC. 4 TO 4$ FOR ODD ADDR. ABORT
2669  025724  005037  140000                  CLR     @#140000        ;CAUSE TIMEOUT ABORT THRU LOC. 4
2670  025730  012706  001100          4$:     MOV     #KERSTK,KSP     ;RESTORE THE STACK POINTER
2671  025734  013702  172314                  MOV     KIPDR6,R2       ;READ KIPDR6 INTO R2
2672  025740  052701  000100                  BIS     #100,R1         ;R1-77506
2673  025744  020102                          CMP     R1,R2           ;WAS W-BIT SET?
2674  025746  001401                          BEQ     5$              ;BRANCH IF YES
2675  025750  104025                          ERROR   25              ;W-BIT WAS NOT SET DURING A TIMEOUT ABORT
2676                                                                  ;FOR TIGHTER SCOPE LOOP
2677                                                                  ;REPLACE ERROR CALL WITH
2678                                                                  ;'BR 3$'' = 000757
2679  025752  010137  172314          5$:     MOV     R1,KIPDR6       ;RESTORE KIPDR6 TO 77406
2680  025756  012737  001400  172354          MOV     #1400,KIPAR6    ;RESTORE KIPAR6 TO 1400
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2681  025764  012737  002076  000004          MOV     #TIMERR,ERRVEC  ;RESTORE NORMAL CPU TRAP ROUTINE TO LOC.4
2682  025772  012737  025640  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2683  026000  004737  035150                  JSR     PC,TON          ;TURN T-BIT TRAPPING BACK ON
2684
2685                                  ;;*****************************************************************
2686                                  ;*
2687                                  ;*      THE NEXT THREE (3) TESTS CAUSE MEMORY MANAGEMENT ERRORS
2688                                  ;*      TO CHECK THE ABILITY OF STATUS REGISTER 0 TO RECORD KT
2689                                  ;*      ERRORS AND THE ABILITY OF STATUS REGISTER 2 TO LOCK UP THE
2690                                  ;*      VIRTUAL ADDR. OF THE INSTRUCTION THAT CAUSED THE ERROR.
2691                                  ;*      THE BITS OF SR2 ARE CHECKED AND BITS <15:13>, <6:5>, AND <3:0>
2692                                  ;*      ARE CHECKED IN SR0.  SO THE SR0 AND SR2 LOGIC AND THE
2693                                  ;*      KT ERROR LOGIC ARE CHECKED.
2694                                  ;*
2695                                  ;;*****************************************************************
2696
2697                                  ;;*****************************************************************
2698                                  ;*TEST 31       NON-RESIDENT ABORT TEST (ACF=0&4)
2699                                  ;*
2700                                  ;*      THIS TEST CHECKS THE ACCESS CONTROL FIELD (ACF) COMPARATOR
2701                                  ;*      LOGIC BY CAUSING NON-RESIDENT ABORTS IN BOTH KERNEL AND
2702                                  ;*      USER MODES.  PDR 4 IS LOADED WITH ACF'S = 0&4 AND
2703                                  ;*      THEN PHYSICAL ADDR. 60000 IS ACCESSED TO CAUSE THE ABORT.
2704                                  ;*
2705                                  ;;*****************************************************************
2706  026004  000004                  TST31:  SCOPE
2707
2708  026006  012700  000600          1$:     MOV     #600,R0         ;LOAD DATA FOR PAR'S INTO R0
2709  026012  010037  172346                  MOV     R0,KIPAR3       ;MAP KERNEL PAR'S 3&4 TO 12-16K
2710  026016  010037  172350                  MOV     R0,KIPAR4
2711  026022  010037  177646                  MOV     R0,UIPAR3       ;MAP USER PAR'S 3&4 TO 12-16K
2712  026026  010037  177650                  MOV     R0,UIPAR4
2713  026032  012737  077406  172306          MOV     #77406,KIPDR3   ;MAP KERNEL PDR 3  128 BLKS, READ-WRITE
2714  026040  012737  077406  177606          MOV     #77406,UIPDR3   ;MAP USER PDR 3  128 BLKS, READ-WRITE
2715  026046  012700  060000                  MOV     #60000,R0       ;LOAD VIRTUAL ADDR. TO REFERENCE PDR3 INTO R0
2716  026052  012701  100000                  MOV     #100000,R1      ;LOAD VIRTUAL ADDR. TO REFERENCE PDR4 INTO R1
2717  026056  012703  100011                  MOV     #100011,R3      ;LOAD R3 WITH WHAT SR0 SHOULD READ - N.R., KERNEL, PG.4
2718  026062  012702  077400                  MOV     #77400,R2       ;LOAD ACF=0 (NON-RESIDENT) PDR VALUE IN R2
2719  026066  012737  026130  000250  2$:     MOV     #5$,MMVEC       ;POINT MEM. MGMT. TRAP VECTOR TO 5$ BELOW
2720  026074  010237  172310                  MOV     R2,KIPDR4       ;LOAD ACF TEST VALUE INTO KIPDR4
2721  026100  010237  177610                  MOV     R2,UIPDR4       ;LOAD ACF TEST VALUE INTO UIPDR4
2722  026104  012737  026112  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
2723  026112  005010                  3$:     CLR     (R0)            ;CLEAR PHYS. LOC. 60000 USING PDR3
2724  026114  013737  177776  001176          MOV     PSW,$TMP0       ;SAVE PSW IN CASE OF ERROR
2725  026122  005211                  4$:     INC     (R1)            ;TRY TO REF. IT USING PDR4 - SHOULD TRAP TO 5$
2726  026124  104026                          ERROR   26              ;MEM. MGMT. ABORT DID NOT OCCUR
2727                                                                  ;FOR TIGHTER SCOPE LOOP
2728                                                                  ;REPLACE ERROR CALL WITH
2729                                                                  ;'BR 3$'' = 000772
2730  026126  000425                          BR      8$              ;BRANCH AROUND STATUS REG. CHECKS IF NO ABORT
2731  026130  062706  000004          5$:     ADD     #4,SP           ;RESTORE STACK POINTER
2732  026134  005710                          TST     (R0)            ;DID INSTRUCTION GET ABORTED & NOT EXECUTE
2733  026136  001401                          BEQ     6$              ;BRANCH IF YES
2734  026140  104027                          ERROR   27              ;INSTRUCTION WAS NOT ABORTED, LOC. GOT CHANGED
2735                                                                  ;FOR TIGHTER SCOPE LOOP
2736                                                                  ;REPLACE ERROR CALL WITH
```

```
2737                                                    ;'BR 3$'' = 000764
2738  026142  013737  177572  001272  6$:     MOV     SR0,WASSR0      ;READ STATUS REGISTER 0
2739  026150  013737  177576  001274          MOV     SR2,WASSR2      ;READ STATUS REGISTER 2
2740  026156  020337  001272                  CMP     R3,WASSR0       ;DID SR0 REPORT NON-RESIDENT ERROR CORRECTLY?
2741  026162  001401                          BEQ     7$              ;BRANCH IF YES
2742  026164  104030                          ERROR   30              ;SR0 DID NOT REPORT NON-RES. ERROR CORRECTLY
2743                                                                  ;FOR TIGHTER SCOPE LOOP
2744                                                                  ;REPLACE ERROR CALL WITH
2745                                                                  ;'BR 3$'' = 000752
2746  026166  012704  026122          7$:     MOV     #4$,R4          ;LOAD R4 WITH WHAT SR2 SHOULD READ
2747  026172  020437  001274                  CMP     R4,WASSR2       ;DID SR2 LOCKUP RIGHT VIRTUAL ADDR. (=4$)?
2748  026176  001401                          BEQ     8$              ;BRANCH IF YES
2749  026200  104031                          ERROR   31              ;SR2 DID NOT LOCK VIRTUAL ADDR. OF NON-RES. ERROR
2750                                                                  ;FOR TIGHTER SCOPE LOOP
2751                                                                  ;REPLACE ERROR CALL WITH
2752                                                                  ;'BR 3$'' = 000744
2753  026202  042737  160000  177572  8$:     BIC     #160C00,SR0     ;CLEAR THE ERROR BITS IN SR0
2754  026210  032737  140000  001176          BIT     #140000,$TMP0   ;HAS ACF=0&4 BEEN TESTED IN USER YET
2755  026216  001006                          BNE     9$              ;BRANCH IF YES
2756  026220  012703  100151                  MOV     #100151,R3      ;LOAD R3 WITH WHAT SR0 SHOULD READ - N.R., USER, PG.4
2757  026224  012737  140000  177776          MOV     #140000,PSW     ;GO TO USER MODE
2758  026232  000715                          BR      2$              ;REPEAT TEST IN USER MODE
2759  026234  022702  077404          9$:     CMP     #77404,R2       ;HAS ACF=4 BEEN TESTED YET?
2760  026240  001407                          BEQ     10$             ;BRANCH IF YES
2761  026242  012702  077404                  MOV     #77404,R2       ;THEN LOAD ACF=4 (NON-RES) PDR VALUE IN R2
2762  026246  012703  100011                  MOV     #100011,R3      ;LOAD R3 WITH WHAT SR0 SHOULD READ-N.R.,KERNEL,PG. 4
2763  026252  005037  177776                  CLR     PSW             ;GO BACK TO KERNEL MODE
2764  026256  000703                          BR      2$              ;GO BACK & TEST ACF=4 IN SAME MODE
2765  026260  005037  177776          10$:    CLR     PSW             ;GO BACK TO KERNEL MODE BEFORE LEAVING
2766  026264  012737  026006  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2767  026272  012737  002150  000250          MOV     #MGMERR,MMVEC   ;RESTORE ADDRESS OF NORMAL MEMORY
2768                                                                  ;MANAGEMENT ERROR ROUTINE TO MMVEC
2769
2770                                  ;;**********************************************************************
2771                                  ;*TEST 32       READ-ONLY ABORT TEST (ACF=2)
2772                                  ;*
2773                                  ;*      THIS TEST CHECKS THE ACCESS CONTROL FIELD (ACF) COMPARATOR
2774                                  ;*      LOGIC BY CAUSING READ-ONLY ABORTS IN BOTH KERNEL AND
2775                                  ;*      USER MODES.  PDR 4 IS LOAD WITH ACF=2 AND THEN
2776                                  ;*      PHYSICAL ADDR. 60000 IS WRITTEN TO CAUSE THE ABORT.
2777                                  ;*
2778                                  ;;**********************************************************************
2779  026300  000004                  TST32:  SCOPE
2780  026302                          1$:                             ;KERNEL & USER PAR'S 3 & 4 AND PDR 3
2781                                                                  ;ARE SETUP FROM LAST TEST
2782  026302  012700  060000                  MOV     #60000,R0       ;LOAD VIRTUAL ADDR. TO REFERENCE PDR3 INTO R0
2783  026306  012701  100000                  MOV     #100000,R1      ;LOAD VIRTUAL ADDR. TO REFERENCE PDR4 INTO R1
2784  026312  012703  020011                  MOV     #20011,R3       ;LOAD R3 WITH WHAT SR0 SHOULD READ - R/O, KERNEL, PG.4
2785  026316  012702  077402                  MOV     #77402,R2       ;LOAD ACF=2 (READ-ONLY) PDR VALUE IN R2
2786  026322  012737  026364  000250  2$:     MOV     #5$,MMVEC       ;POINT MEM. MGMT. TRAP VECTOR TO 5$ BELOW
2787  026330  010237  172310                  MOV     R2,KIPDR4       ;LOAD ACF=2 INTO KIPDR4
2788  026334  010237  177610                  MOV     R2,UIPDR4       ;LOAD ACF=2 INTO UIPDR4
2789  026340  012737  026346  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
2790  026346  005010                  3$:     CLR     (R0)            ;CLEAR PHYS. LOC. 60000 USING PDR3
2791  026350  013737  177776  001176          MOV     PSW,$TMP0       ;SAVE PSW IN CASE OF ERROR
2792  026356  005211                  4$:     INC     (R1)            ;TRY TO WRITE USING PDR4 - SHOULD TRAP TO 5$
```

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2793  026360  104026                        ERROR   26              ;MEM. MGMT. ABORT DID NOT OCCUR
2794                                                                  ;FOR TIGHTER SCOPE LOOP
2795                                                                  ;REPLACE ERROR CALL WITH
2796                                                                  ;'BR 3$'' = 000772
2797  026362  000425                        BR      8$              ;BRANCH AROUND STATUS REG. CHECKS IF NO ABORT
2798  026364  062706  000004        5$:     ADD     #4,SP           ;RESTORE STACK POINTER
2799  026370  005710                        TST     (R0)            ;DID INSTRUCTION GET ABORTED & NOT EXECUTE
2800  026372  001401                        BEQ     6$              ;BRANCH IF YES
2801  026374  104027                        ERROR   27              ;INSTRUCTION WAS NOT ABORTED, LOC. GOT CHANGED
2802                                                                  ;FOR TIGHTER SCOPE LOOP
2803                                                                  ;REPLACE ERROR CALL WITH
2804                                                                  ;'BR 3$'' = 000764
2805  026376  013737  177572  001272  6$:     MOV     SR0,WASSR0      ;READ STATUS REG. 0
2806  026404  013737  177576  001274          MOV     SR2,WASSR2      ;READ STATUS REG. 2
2807  026412  020337  001272                CMP     R3,WASSR0       ;DID SR0 REPORT READ-ONLY ERROR CORRECTLY?
2808  026416  001401                        BEQ     7$              ;BRANCH IF YES
2809  026420  104030                        ERROR   30              ;SR0 DID NOT REPORT R/O ERROR CORRECTLY
2810                                                                  ;FOR TIGHTER SCOPE LOOP
2811                                                                  ;REPLACE ERROR CALL WITH
2812                                                                  ;'BR 3$'' = 000752
2813  026422  012704  026356        7$:     MOV     #4$,R4          ;LOAD R4 WITH WHAT SR2 SHOULD READ
2814  026426  020437  001274                CMP     R4,WASSR2       ;DID SR2 LOCKUP RIGHT VIRTUAL ADDR. (=4$)?
2815  026432  001401                        BEQ     8$              ;BRANCH IF YES
2816  026434  104031                        ERROR   31              ;SR2 DID NOT LOCKUP VIRTUAL ADDR. OF R/O ERROR
2817                                                                  ;FOR TIGHTER SCOPE LOOP
2818                                                                  ;REPLACE ERROR CALL WITH
2819                                                                  ;'BR 3$'' = 000744
2820  026436  042737  160000  177572  8$:     BIC     #160000,SR0     ;CLEAR THE ERROR BITS IN SR0
2821  026444  032737  140000  001176          BIT     #140000,$TMP0   ;HAS ACF=2 BEEN TESTED IN USER MODE?
2822  026452  001006                        BNE     9$              ;BRANCH IF YES
2823  026454  012703  020151                MOV     #20151,R3       ;LOAD R3 WITH WHAT SR0 SHOULD READ-R/O, USER, PG.4
2824  026460  012737  140000  177776        MOV     #140000,PSW     ;GO TO USER MODE
2825  026466  000715                        BR      2$              ;REPEAT TEST IN USER MODE
2826  026470  005037  177776        9$:     CLR     PSW             ;GO BACK TO KERNEL MODE BEFORE LEAVING
2827  026474  012737  026302  001110        MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2828  026502  012737  002150  000250        MOV     #MGMERR,MMVEC   ;RESTORE ADDRESS OF NORMAL MEMORY
2829                                                                  ;MANAGEMENT ERROR ROUTINE TO MMVEC.
2830
2831
2832
2833
2834
2835
2836
2837
2838
2839
2840
2841                                ;;*****************************************************************
2842                                ;*
2843                                ;*      THE NEXT TWO (2) TESTS WILL BE CHECKING THE PAGE LENGTH
2844                                ;*      COMPARATORS AND SOME MORE OF THE KT ERROR DETECTION
2845                                ;*      AND STATUS LOGIC.  THE PAGE LENGTH FIELD (PLF) IN KERNEL
2846                                ;*      PDR 4 IS VARIED AND FOR EVERY PLF, THREE (3) VIRTUAL
2847                                ;*      ADDRESSES ARE READ.  WHILE USING BOTH UPWARD & DOWNWARD PAGE
2848                                ;*      EXPANSION, ONE OF THOSE THREE VIRTUAL ADDRESSES WILL CAUSE A
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2849                                    ;*      'PAGE LENGTH ABORT'' WHILE THE OTHER TWO WON'T.
2850                                    ;*
2851                                    ;*      STATUS REGISTER 0 & 2 ARE CHECKED WHEN THE PAGE LENGTH
2852                                    ;*      ABORT DOES OCCUR TO SEE THAT THE ABORT IS REPORTED AND THAT
2853                                    ;*      THE VIRTUAL ADDRESS OF THE INSTRUCTION THAT CAUSED THE ABORT
2854                                    ;*      IS LOCKED UP.
2855                                    ;*
2856                                    ;;*****************************************************************
2857
2858
2859
2860                                    ;;*****************************************************************
2861                                    ;*TEST 33       PAGE LENGTH FAULTS-UPWARD EXPANSION
2862                                    ;*
2863                                    ;*      THIS TEST VARIES THE PAGE LENGTH FIELD (PLF) IN KERNEL PDR 4
2864                                    ;*      FROM 1 TO 177 AND FOR EACH PLF, THREE VIRTUAL ADDRESSES (VBA'S)
2865                                    ;*      ARE ACCESSED.  WHEN VBA <12:6> IS LESS THAN OR EQUAL TO PDR <14:8>
2866                                    ;*      NO ABORT SHOULD OCCUR.  WHEN VBA <12:6> IS GREATER THAN PDR <14:8>,
2867                                    ;*      A PAGE LENGTH ABORT SHOULD OCCUR AND BE REPORTED BY SR0 & SR2.
2868                                    ;*      THE PAGE EXPANSION DIRECTION IN THIS TEST IS UPWARD, (THE ED BIT
2869                                    ;*      (BIT 3) OF PDR 4 = 0).
2870                                    ;*
2871                                    ;;*****************************************************************
2872  026510  000004                    TST33:  SCOPE
2873  026512  012737  077406  172306    1$:     MOV     #77406,KIPDR3   ;MAKE SURE PDR3 IS DESCRIBED AS R/W
2874  026520  012737  077406  172312            MOV     #77406,KIPDR5   ;MAKE SURE PDR5 IS DESCRIBED AS R/W
2875  026526  012700  027006                    MOV     #DALTB1,R0      ;DAL TABLE FOR VIRTUAL ADDR'S. TO SELECT PDR4.
2876  026532  012704  027024                    MOV     #PDRTB1,R4      ;PDR TABLE FOR PDR4 (COINCIDES WITH DAL TABLE).
2877  026536  012701  000006                    MOV     #6,R1           ;SET UP LOOP COUNTER.
2878  026542  012737  026720  000250            MOV     #9$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR UNEXPECTED ABORTS
2879  026550  012737  026562  001110            MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
2880  026556  012706  001100                    MOV     #KERSTK,KSP     ;MAKE SURE STACK POINTER IS ALL SET UP
2881
2882                                    ;TEST NON-ABORT CASES (VBA < OR = PLF)
2883  026562  012437  172310            2$:     MOV     (R4)+,KIPDR4    ;LOAD KIPDR4 WITH PAGE LENGTH VALUE
2884  026566  005730                            TST     @(R0)+          ;ACCESS VIRTUAL ADDR. (VBA < OR = PLF)
2885                                                                    ;NO ABORT SHOULD OCCUR!!!
2886  026570  077104                            SOB     R1,2$           ;DONE?...NO- TEST NEXT COMBINATION OF DAL & PDR.
2887
2888                                    ;TEST ABORT CASES (VBA > PLF)
2889  026572  012701  000005            3$:     MOV     #5,R1           ;SET UP LOOP COUNTER.
2890  026576  012700  027042                    MOV     #DALTB2,R0      ;DAL TABLE
2891  026602  012704  027056                    MOV     #PDRTB2,R4      ;PDR TABLE
2892  026606  012737  026622  001110            MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
2893  026614  012737  026634  000250            MOV     #6$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR EXPECTED ABORT
2894
2895  026622  012437  172310            4$:     MOV     (R4)+,KIPDR4    ;LOAD KIPDR4 WITH PAGE LENGHT VALUE
2896  026626  005730                    5$:     TST     @(R0)+          ;ACCESS VIRTUAL ADDR. (VBA > PLF - ABORT TO 6$)
2897  026630  104033                            ERROR   33              ;EXPECTED PAGE LENGTH ABORT DID NOT OCCUR
2898                                                                    ;FOR TIGHTER SCOPE LOOP
2899                                                                    ;REPLACE ERROR CALL WITH
2900                                                                    ;'BR 5$'' = 000776
2901  026632  000424                            BR      8$              ;BRANCH AROUND ABORT CHECKS
2902  026634  012706  001100            6$.     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER FOLLOWING ABORT
2903  026640  013737  177572  001272            MOV     SR0,WASSR0      ;READ M.M. STATUS REG. 0
2904  026646  013737  177576  001274            MOV     SR2,WASSR2      ;READ M.M. STATUS REG. 2
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2905  026654  012702  040011                    MOV     #40011,R2       ;PUT EXPECTED SR0 CONTENTS IN R2
2906  026660  020237  001272                    CMP     R2,WASSR0       ;DID SR0 REPORT PG. LENGTH ABORT, PAGE 4, KERNEL?
2907  026664  001401                            BEQ     7$              ;BRANCH IF YES
2908  026666  104034                            ERROR   34              ;SR0 DID NOT REPORT PG. LENGTH ABORT CORRECTLY
2909                                                                    ;FOR TIGHTER SCOPE LOOP
2910                                                                    ;REPLACE ERROR CALL WITH
2911                                                                    ;'BR 5$'' = 000757
2912  026670  012703  026626          7$:       MOV     #5$,R3          ;PUT EXPECTED SR2 CONTENTS IN R3
2913  026674  020337  001274                    CMP     R3,WASSR2       ;DID SR2 LOCKUP VIRT. ADDR. OF ABORTED INSTRUCTION?
2914  026700  001401                            BEQ     8$              ;BRANCH IF YES
2915  026702  104035                            ERROR   35              ;SR2 DID NOT LOCKUP VIRT. ADDR. OF ABORT CORRECTLY
2916                                                                    ;FOR TIGHTER SCOPE LOOP
2917                                                                    ;REPLACE ERROR CALL WITH
2918                                                                    ;'BR 5$'' = 000751
2919  026704  042737  160000  177572  8$:       BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
2920  026712  077135                            SOB     R1,4$           ;DONE?..NO - GET NEXT DAL & PDR PAIR
2921  026714  000137  026766                    JMP     10$             ;YES...
2922  026720  012637  001266          9$:       MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
2923  026724  012637  001270                    MOV     (KSP)+,TRAPPS
2924  026730  013737  177572  001272            MOV     SR0,WASSR0      ;SAVE CONTENTS OF SR0 FOR ERROR
2925  026736  013737  177576  001274            MOV     SR2,WASSR2      ;SAVE CONTENTS OF SR2 FOR ERROR
2926  026744  042737  160000  177572            BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
2927  026752  104032                            ERROR   32              ;GOT PG. LENGTH ABORT BEFORE IT WAS EXPECTED
2928                                                                    ;FOR TIGHTER SCOPE LOOP
2929                                                                    ;REPLACE ERROR CALL WITH
2930                                                                    ;A 'NOP'' = 000240
2931  026754  013746  001270                    MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
2932  026760  013746  001266                    MOV     TRAPPC,-(KSP)
2933  026764  000002                            RTI                     ;RETURN FROM UNEXPECTED ABORT
2934
2935  026766  012737  026512  001110  10$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2936  026774  012737  002150  000250            MOV     #MGMERR,MMVEC   ;RESTORE NORMAL M.M. TRAP HANDLER
2937                                                                    ;ADDRESS TO M.M. TRAP VECTOR
2938  027002  000137  027072                    JMP     TST34
2939
2940                                            ;DAL TABLE FOR UPWARD EXPANSION (NON-ABORT CASES)
2941  027006  100000                    DALTB1: 100000
2942  027010  106100                            106100
2943  027012  102300                            102300
2944  027014  102500                            102500
2945  027016  113700                            113700
2946  027020  104600                            104600
2947  027022  117700                            117700
2948
2949                                            ;PDR TABLE FOR KPDR4 (NON-ABORT CASES)
2950  027024  000006                    PDRTB1: 000006
2951  027026  052006                            052006
2952  027030  045006                            045006
2953  027032  052006                            052006
2954  027034  074406                            074406
2955  027036  025006                            025006
2956  027040  077406                            077406
2957
2958                                            ;DAL TABLE (ABORT CASES)
2959  027042  100100                    DALTB2: 100100
2960  027044  110100                            110100
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                                                116600
                                                112700
                                                117000
                                                117700

                                        ;PDR TABLE (ABORT CASES)
                                        PDRTB2: 000006
                                                030406
                                                046406
                                                042006
                                                073406
                                                077006


                                        ;;*****************************************************************
                                        ;*TEST 34        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).
                                        ;*
                                        ;;*****************************************************************
000004                                  TST34:  SCOPE
012700  027354                          1$:     MOV     #DALTB3,R0      ;DAL TABLE FOR VIRTUAL ADDR'S. TO SELECT PDR4.
012704  027372                                  MOV     #PDRTB3,R4      ;PDR TABLE FOR PDR4 (COINCIDES WITH DAL TABLE).
012701  000006                                  MOV     #6,R1           ;SET UP LOOP COUNTER.
012737  027266  000250                          MOV     #9$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR UNEXPECTED ABORTS
012737  027130  001110                          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
012706  001100                                  MOV     #KERSTK,KSP     ;MAKE SURE STACK POINTER IS ALL SET UP

                                        ;TEST NON-ABORT CASES (VBA > OR = PLF)
012437  172310                          2$:     MOV     (R4)+,KIPDR4    ;LOAD KIPDR4 WITH PAGE LENGTH VALUE
005730                                          TST     @(R0)+          ;ACCESS VIRTUAL ADDR. (VBA > OR = PLF)
                                                                        ;NO ABORT SHOULD OCCUR!!!
077104                                          SOB     R1,2$           ;DONE?...NO- TEST NEXT COMBINATION OF DAL & PDR.

                                        ;TEST ABORT CASES (VBA < PLF)
012701  000005                          3$:     MOV     #5,R1           ;SET UP LOOP COUNTER.
012700  027410                                  MOV     #DALTB4,R0      ;DAL TABLE
012704  027424                                  MOV     #PDRTB4,R4      ;PDR TABLE
012737  027170  001110                          MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
012737  027202  000250                          MOV     #6$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR EXPECTED ABORT

012437  172310                          4$:     MOV     (R4)+,KIPDR4    ;LOAD KIPDR4 WITH PAGE LENGHT VALUE
005730                                  5$:     TST     @(R0)+          ;ACCESS VIRTUAL ADDR. (VBA < PLF - ABORT TO 6$)
104033                                          ERROR   33              ;EXPECTED PAGE LENGTH ABORT DID NOT OCCUR
                                                                        ;FOR TIGHTER SCOPE LOOP
                                                                        ;REPLACE ERROR CALL WITH
                                                                        ;'BR 5$'' = 000776
000424                                          BR      8$              ;BRANCH AROUND ABORT CHECKS
012706  001100                          6$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER FOLLOWING ABORT
013737  177572  001272                          MOV     SR0,WASSR0      ;READ M.M. STATUS REG. 0
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3017  027214  013737  177576  001274          MOV     SR2,WASSR2      ;READ M.M. STATUS REG. 2
3018  027222  012702  040011                  MOV     #40011,R2       ;PUT EXPECTED SR0 CONTENTS IN R2
3019  027226  020237  001272                  CMP     R2,WASSR0       ;DID SR0 REPORT PG. LENGTH ABORT, PAGE 4, KERNEL?
3020  027232  001401                          BEQ     7$              ;BRANCH IF YES
3021  027234  104034                          ERROR   34              ;SR0 DID NOT REPORT PG. LENGTH ABORT CORRECTLY
3022                                                                  ;FOR TIGHTER SCOPE LOOP
3023                                                                  ;REPLACE ERROR CALL WITH
3024                                                                  ;'BR 5$'' = 000757
3025  027236  012703  027174          7$:     MOV     #5$,R3          ;PUT EXPECTED SR2 CONTENTS IN R3
3026  027242  020337  001274                  CMP     R3,WASSR2       ;DID SR2 LOCKUP VIRT. ADDR. OF ABORTED INSTRUCTION?
3027  027246  001401                          BEQ     8$              ;BRANCH IF YES
3028  027250  104035                          ERROR   35              ;SR2 DID NOT LOCKUP VIRT. ADDR. OF ABORT CORRECTLY
3029                                                                  ;FOR TIGHTER SCOPE LOOP
3030                                                                  ;REPLACE ERROR CALL WITH
3031                                                                  ;'BR 5$'' = 000751
3032  027252  042737  160000  177572  8$:     BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
3033  027260  077135                          SOB     R1,4$           ;DONE?..NO - GET NEXT DAL & PDR PAIR
3034  027262  000137  027334                  JMP     10$             ;YES...
3035  027266  012637  001266          9$:     MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
3036  027272  012637  001270                  MOV     (KSP)+,TRAPPS
3037  027276  013737  177572  001272          MOV     SR0,WASSR0      ;SAVE CONTENTS OF SR0 FOR ERROR
3038  027304  013737  177576  001274          MOV     SR2,WASSR2      ;SAVE CONTENTS OF SR2 FOR ERROR
3039  027312  042737  160000  177572          BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
3040  027320  104032                          ERROR   32              ;GOT PG. LENGTH ABORT BEFORE IT WAS EXPECTED
3041                                                                  ;FOR TIGHTER SCOPE LOOP
3042                                                                  ;REPLACE ERROR CALL WITH
3043                                                                  ;A 'NOP'' = 000240
3044  027322  013746  001270                  MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
3045  027326  013746  001266                  MOV     TRAPPC,-(KSP)
3046  027332  000002                          RTI                     ;RETURN FROM UNEXPECTED ABORT
3047
3048  027334  012737  027074  001110  10$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
3049  027342  012737  002150  000250          MOV     #MGMERR,MMVEC   ;RESTORE NORMAL M.M. TRAP HANDLER
3050                                                                  ;ADDRESS TO M.M. TRAP VECTOR
3051  027350  000137  027440                  JMP     TST35
3052
3053                                  ;DAL TABLE FOR DOWNWARD EXPANSION (NON-ABORT CASES)
3054  027354  117700                  DALTB3: 117700
3055  027356  111600                          111600
3056  027360  115400                          115400
3057  027362  115200                          115200
3058  027364  104000                          104000
3059  027366  113100                          113100
3060  027370  100000                          100000
3061
3062                                  ;PDR TABLE (NON-ABORT CASES)
3063  027372  077416                  PDRTB3: 77416
3064  027374  025416                          25416
3065  027376  032416                          32416
3066  027400  025416                          25416
3067  027402  003016                          03016
3068  027404  052416                          52416
3069  027406  000016                          00016
3070
3071                                  ;DAL TABLE (ABORT CASES)
3072  027410  117600                  DALTB4: 117600
```

```
3073  027412  107600                          107600
3074  027414  101100                          101100
3075  027416  105000                          105000
3076  027420  100700                          100700
3077  027422  100000                          100000
3078
3079                                  ;PDR TABLE (ABORT CASES)
3080  027424  077416                  PDRTB4: 77416
3081  027426  047016                          47016
3082  027430  031016                          31016
3083  027432  035416                          35416
3084  027434  004016                          04016
3085  027436  000416                          00416
3086
3087
3088
3089                                  ;;*****************************************************************
3090                                  ;*TEST 35       SR2 BIT TEST
3091                                  ;*
3092                                  ;*      THIS TEST CHECKS THE BITS IN MEMORY MANAGEMENT REGISTER 2 BY
3093                                  ;*      CAUSING 'READ-ONLY ABORTS'' AT VIRTUAL ADDRESSES BETWEEN 100000
3094                                  ;*      TO 110000 (PHYSICAL ADDRESSES 060000-070000).  KIPDR4 IS USED TO EXECUTE
3095                                  ;*      THE FOLLOWING FOUR WORDS OF CODE WHICH ARE MOVED THRU MEMORY:
3096                                  ;*      010727  MOV     PC,(PC)+  ;THIS INSTRUCTION SHOULD CAUSE A R/O ABORT
3097                                  ;*      000000                    ;ITS VIRTUAL ADDR. SHOULD BE LOCKED UP IN SR2
3098                                  ;*      000137  JMP     @#3$      ;THIS INSTRUCTION IS ALSO MOVED THRU MEMORY
3099                                  ;*      (ADDR. OF 3$)             ;IN CASE A R/O ABORT DOES NOT OCCUR,
3100                                  ;*                                ;IN WHICH CASE SR2 WILL NOT CONTAIN CORRECT ADDR.
3101                                  ;*
3102                                  ;;*****************************************************************
3103  027440  000004                  TST35:  SCOPE
3104  027442  012737  000600  172346  1$:     MOV     #600,KIPAR3       ;BE SURE PAR3 IS MAPPED TO 12-16K
3105  027450  012737  000600  172350          MOV     #600,KIPAR4       ;BE SURE PAR4 IS MAPPED TO 12-16K
3106  027456  012737  077406  172306          MOV     #77406,KIPDR3     ;MAP PAGE 3  128 BLOCKS, R/W
3107  027464  012737  077402  172310          MOV     #77402,KIPDR4     ;MAP PAGE 4  128 BLOCKS, READ-ONLY
3108  027472  012700  060002                  MOV     #60002,R0         ;LOAD R0 WITH VIRTUAL ADDR. WHICH USES PDR3
3109  027476  012701  100002                  MOV     #100002,R1        ;LOAD R1 WITH VIRTUAL ADDR. WHICH USES PDR4
3110  027502  012737  027536  000250          MOV     #3$,MMVEC         ;SET M.M. TRAP VECTOR TO 3$
3111  027510  012737  027516  001110          MOV     #2$,$LPERR        ;SET LOOP ON ERROR POINTER TO 2$
3112  027516  012720  010727          2$:     MOV     #010727,(R0)+     ;LOAD 'MOV PC,(PC)+'' INSTRUCTION AT ADDR.
3113  027522  005020                          CLR     (R0)+             ;       REACHED THRU PDR/PAR 4.
3114  027524  012720  000137                  MOV     #000137,(R0)+     ;LOAD ''JMP @#3$'' INSTRUCTION AT VIRT. ADDR.
3115  027530  012710  027536                  MOV     #3$,(R0)          ;       IN CASE R/O VIOL. DOES NOT ABORT
3116  027534  010107                          MOV     R1,PC             ;TRANSFER PROGRAM EXECUTION TO 'PAGE 4 INSTRUCTIONS''
3117  027536  012706  001100          3$:     MOV     #KERSTK,KSP       ;RESTORE STACK POINTER
3118  027542  013737  177576  001274          MOV     SR2,WASSR2        ;READ CONTENTS OF STATUS REG 2
3119  027550  020137  001274                  CMP     R1,WASSR2         ;WAS ADDR. OF 'RELOCATED - R/O ABORT'' LOCKED UP?
3120  027554  001401                          BEQ     4$                ;BRANCH IF YES
3121  027556  104036                          ERROR   36                ;SR2 DID NOT LOCK UP VIRTUAL ADDR. OF R/O VIOL.
3122                                                                    ;FOR TIGHTER SCOPE LOOP
3123                                                                    ;REPLACE ERROR CALL WITH
3124                                                                    ;'BR 2$'' = 000757
3125  027560  042737  160000  177572  4$:     BIC     #160000,SR0       ;CLEAR THE ERROR BITS IN SR0
3126  027566  060101                          ADD     R1,R1             ;SETUP TO FORM NEXT VIRTUAL ADDRESS
3127  027570  010100                          MOV     R1,R0             ;SETUP R0 TO FORM NEXT VIRT. ADDR. TO LOAD
3128  027572  052701  100000                  BIS     #100000,R1        ;FORM VIRTUAL ADDR. THAT SHOULD BE LOCKED UP NEXT
```

```
3129  027576  052700  060000                  BIS     #60000,R0       ;POINT R0 TO NEXT VIRT. ADDR. TO LOAD
3130  027602  020127  110000                  CMP     R1,#110000      ;HAVE ALL VBA'S 100000-110000 BEEN TESTED?
3131  027606  101743                          BLOS    2$              ;BRANCH IF NO
3132
3133  027610  012737  027442  001110  5$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
3134  027616  012737  077406  172310          MOV     #77406,KIPDR4   ;RESTORE PDR4 TO R/W ACCESS
3135  027624  012737  002150  000250          MOV     #MGMERR,MMVEC   ;RESTORE ADDRESS OF NORMAL M.M.
3136                                                                  ;TRAP HANDLER TO M.M. VECTOR
3137
3138
3139                                          ;;*****************************************************************
3140                                          ;*TEST 36       MORE CHECKS OF SR0 & SR2
3141                                          ;*
3142                                          ;*      THIS TEST PERFORMS SOME ADDITIONAL CHECKS OF THE SR0 & SR2 LOGIC.
3143                                          ;*      FIRST IT CHECKS THAT SR2 ''TRACKS'' ALONG ACTING AS A VIRTUAL ADDRESS
3144                                          ;*      PROGRAM COUNTER.  ALSO SR0 & SR2 ARE LOCKED UP BY A PAGE LENGTH
3145                                          ;*      ABORT, THEN WITHOUT CLEARING SR0'S ERROR BITS, A R/O ABORT IS CAUSED.
3146                                          ;*      SR0 & SR2 SHOULD NOT BE CHANGED BY THE SECOND ABORT AND THE
3147                                          ;*      INFORMATION ABOUT THE PAGE LENGTH ABORT SOULD STILL BE LOCKED UP.
3148                                          ;*      IN ADDITION A 'RESET'' IS EXECUTED TO VERIFY THAT SR0 IS CLEARED
3149                                          ;*      AND SR2 IS UNLOCKED BY A RESET.  AFTER MEMORY MANAGEMENT IS TURNED BACK ON,
3150                                          ;*      SR2 IS CHECKED TO SEE THAT IT IS TRACKING AGAIN.
3151                                          ;*
3152                                          ;;*****************************************************************
3153  027632  000004                  TST36:  SCOPE
3154  027634  012737  000600  172352  1$:     MOV     #600,KIPAR5     ;MAP KERNEL PAGE 5 TO 12-16K
3155  027642  012737  000406  172310          MOV     #406,KIPDR4     ;SETUP PDR4 FOR PAGE LENGTH ABORT
3156  027650  012737  077402  172312          MOV     #77402,KIPDR5   ;SETUP PDR5 FOR R/O ABORT
3157  027656  012737  027664  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
3158  027664  013737  177576  001274  2$:     MOV     SR2,WASSR2      ;READ SR2 TO SEE IF ITS TRACKING
3159  027672  012701  027664                  MOV     #2$,R1          ;PUT EXPECTED VIRTUAL PC IN R1
3160  027676  020137  001274                  CMP     R1,WASSR2       ;DID SR2 CONTAIN VIRTUAL PC AT 2$?
3161  027702  001401                          BEQ     3$              ;BRANCH IF YES
3162  027704  104041                          ERROR   41              ;SR2 NOT TRACKING CORRECTLY
3163                                                                  ;FOR TIGHTER SCOPE LOOP
3164                                                                  ;REPLACE ERROR CALL WITH
3165                                                                  ;''BR 2$'' = 000767
3166  027706  012737  027714  001110  3$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
3167  027714  013737  177576  001274  4$:     MOV     SR2,WASSR2      ;READ SR2 TO SEE IF ITS TRACKING
3168  027722  012701  027714                  MOV     #4$,R1          ;PUT EXPECTED VIRTUAL PC IN R1
3169  027726  020137  001274                  CMP     R1,WASSR2       ;DID SR2 CONTAIN VIRTUAL PC AT 4$
3170  027732  001401                          BEQ     5$              ;BRANCH IF YES
3171  027734  104041                          ERROR   41              ;SR2 NOT TRACKING CORRECTLY
3172                                                                  ;FOR TIGHTER SCOPE LOOP
3173                                                                  ;REPLACE ERROR CALL WITH
3174                                                                  ;''BR 4$'' = 000767
3175  027736  012737  027744  001110  5$:     MOV     #6$,$LPERR      ;SET LOOP ON ERROR POINTER TO 6$
3176  027744  012737  027762  000250  6$:     MOV     #7$,MMVEC       ;PUT ADDRESS OF 7$ IN M.M. TRAP VECTOR
3177  027752  005037  001200                  CLR     $TMP1           ;CLEAR ERROR INDICATOR
3178  027756  005237  100500                  INC     @#100500        ;CAUSE PAGE LENGTH ABORT - TRAP TO 7$
3179  027762  012706  001100          7$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER AFTER ABORT
3180  027766  013737  177572  001176          MOV     SR0,$TMP0       ;SAVE SR0'S INFORMATION ON PG. LGTH. ABORT
3181  027774  013737  177576  001202          MOV     SR2,$TMP2       ;SAVE SR2'S INFORMATION ON PG. LGTH. ABORT
3182  030002  012737  030014  000250          MOV     #8$,MMVEC       ;PUT ADDRESS OF 8$ IN M.M. TRAP VECTOR
3183  030010  005237  120000                  INC     @#120000        ;CAUSE R/O ABORT - TRAP TO 8$
3184  030014  012706  001100          8$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER AFTER ABORT
```

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3185  030020  013737  177572  001272        MOV     SR0,WASSR0      ;READ SR0 FOLLWOING SECOND KT ABORT
3186  030026  013737  177576  001274        MOV     SR2,WASSR2      ;READ SR2 FOLLOWING SECOND KT ABORT
3187  030034  023737  001176  001272        CMP     $TMP0,WASSR0    ;IS SR0 STILL HOLDING INFO ON FIRST ABORT?
3188  030042  001402                        BEQ     9$              ;BRANCH IF YES
3189  030044  005237  001200                INC     $TMP1           ;SET ERROR INDICATOR
3190  030050  023737  001202  001274  9$:   CMP     $TMP2,WASSR2    ;DOES SR2 STILL HOLD PC OF FIRST ABORT?
3191  030056  001402                        BEQ     10$             ;BRANCH IF YES
3192  030060  005237  001200                INC     $TMP1           ;SET ERROR INDICATOR
3193  030064  005737  001200          10$:  TST     $TMP1           ;WERE SR0 OR SR2 CHANGED BY A SECOND ABORT?
3194  030070  001401                        BEQ     11$             ;BRANCH IF NO
3195  030072  104037                        ERROR   37              ;ONE OF STATUS REGS. CHANGED BY SECOND ABORT
3196                                                                ;FOR TIGHTER SCOPE LOOP
3197                                                                ;REPLACE ERROR CALL WITH
3198                                                                ;''BR 6$'' = 000726
3199  030074  005037  001200          11$:  CLR     $TMP1           ;CLEAR ERROR INDICATOR
3200  030100  000005                        RESET                   ;EXECUTE A RESET, APPLYING AN ''INIT''
3201  030102  013737  177572  001272        MOV     SR0,WASSR0      ;READ SR0
3202  030110  005737  001272                TST     WASSR0          ;WAS SR0 CLEARED BY THE RESET?
3203  030114  001402                        BEQ     12$             ;BRANCH IF YES
3204  030116  005237  001200                INC     $TMP1           ;SR0 NOT CLEARED BY A RESET
3205  030122  013737  177576  001274  12$:  MOV     SR2,WASSR2      ;READ SR2
3206  030130  022737  030122  001274        CMP     #12$,WASSR2     ;WAS SR2 UNLOCKED BY A RESET?
3207  030136  001402                        BEQ     13$             ;BRANCH IF YES
3208  030140  005237  001200                INC     $TMP1           ;SR2 NOT UNLOCKED BY A RESET
3209  030144  005737  001200          13$:  TST     $TMP1           ;WERE SR0 & SR2 BOTH ''RESET'' BY A RESET?
3210  030150  001401                        BEQ     14$             ;BRANCH IF YES
3211  030152  104040                        ERROR   40              ;SR0 OR SR2 NOT ''RESET'' BY A RESET
3212                                                                ;FOR TIGHTER SCOPE LOOP
3213                                                                ;REPLACE ERROR CALL WITH
3214                                                                ;''BR 6$'' = 000676
3215  030154  012737  000001  177572  14$:   MOV     #1,SR0          ;TURN MEMORY MANAGEMENT BACK ON
3216  030162  013737  177576  001274  15$:   MOV     SR2,WASSR2      ;READ SR2 TO SEE IF ITS TRACKING AGAIN
3217  030170  012701  030162                MOV     #15$,R1         ;PUT EXPECTED VIRTUAL PC IN R1
3218  030174  020137  001274                CMP     R1,WASSR2       ;DID SR2 CONTAIN VIRTUAL PC AT 15$
3219  030200  001401                        BEQ     16$             ;BRANCH IF YES
3220  030202  104041                        ERROR   41              ;SR2 NOT TRACKING CORRECTLY
3221                                                                ;FOR TIGHTER SCOPE LOOP
3222                                                                ;REPLACE ERROR CALL WITH
3223                                                                ;''BR 6$'' = 000663
3224  030204  012737  027634  001110  16$:   MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
3225  030212  012737  077406  172310        MOV     #77406,KIPDR4   ;RESET PDR4 TO 128 BLKS, R/W
3226  030220  012737  077406  172312        MOV     #77406,KIPDR5   ;RESET PDR5 TO 128 BLKS, R/W
3227  030226  012737  002150  000250        MOV     #MGMERR,MMVEC   ;RESTORE ADDRESS OF NORMAL MEMORY
3228                                                                ;MANAGEMENT TRAP ROUTINE TO M.M. VECTOR
3229
3230
3231                                ;;*****************************************************************
3232                                ;*TEST 37       USER ABORT PICKS UP KERNEL SPACE VECTOR
3233                                ;*
3234                                ;*      THIS TEST CHECKS TO BE SURE THAT WHEN AN ABORT OCCURS WHILE IN
3235                                ;*      USER MODE, THE TRAP VECTOR INFORMATION FETCHED IS TAKEN FROM
3236                                ;*      KERNEL SPACE.  USER PAGE 0 IS MAPPED TO 12K (60000-77776) SO
3237                                ;*      THAT IF USER SPACE IS USED INSTEAD OF KERNEL, THE NEW PC THAT
3238                                ;*      WAS LOADED AT LOC. 060004 IS USED INSTEAD OF THE NEW PC THAT
3239                                ;*      SHOULD BE PICKED UP FROM LOC. 000004.  A TIMEOUT ERROR IS USED
3240                                ;*      TO CAUSE A TRAP TO ''4''.
```

```
3241                                    ;*
3242                                    ;;**********************************************************************
3243  030234  000004                    TST37:  SCOPE
3244  030236  004737  035114            1$:     JSR     PC,TOFF         ;TURN OFF T-BIT TRAPPING FOR THIS TEST
3245  030242  012737  030250  001110            MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
3246  030250  005037  177776            2$:     CLR     PSW             ;GO TO KERNEL MODE
3247  030254  012706  001100                    MOV     #KERSTK,KSP     ;SETUP KERNEL STACK PTR.
3248  030260  012737  000600  177640            MOV     #600,UIPAR0     ;MAP USER PAGE 0 TO 12K
3249  030266  012737  030350  000004            MOV     #4$,@#4         ;LOAD KERNEL VECTOR 4 (LOC.4) WITH 4$
3250  030274  012737  000340  000006            MOV     #340,@#6        ;LOAD VECTOR+2 WITH NEW PSW
3251  030302  012737  140000  177776            MOV     #140000,PSW     ;GO TO USER MODE
3252  030310  012706  000700                    MOV     #USESTK,USP     ;SETUP USER STACK PTR.
3253  030314  012737  030334  000004            MOV     #3$,@#4         ;LOAD USER VECTOR 4 (LOC. 60004) WITH 3$
3254  030322  012737  000340  000006            MOV     #340,@#6        ;LOAD VECTOR+2 WITH NEW PSW
3255  030330  005737  160000                    TST     160000          ;CAUSE TIMEOUT ERROR TRAP TO "4"
3256                                            ;SHOULD PICK UP NEW PC=4$ FROM KERNEL
3257                                            ;LOC. 4, NOT PC=3$ FROM USER LOC. 4 (=60004)
3258  030334  013701  177776            3$:     MOV     PSW,R1          ;SAVE PSW FOR ERROR
3259  030340  010602                            MOV     SP,R2           ;SAVE VALUE OF STACK POINTER FOR ERROR
3260  030342  005037  177776                    CLR     PSW             ;BE SURE BACK IN KERNEL MODE
3261  030346  104042                            ERROR   42              ;DID NOT TRAP THRU KERNEL SPACE
3262                                            ;FOR TIGHTER SCOPE LOOP
```

```
3263                                                    ;REPLACE ERROR CALL WITH
3264                                                    ;'BR 2$'' = 000740
3265  030350  005037  177776          4$:     CLR     PSW             ;BE SURE BACK IN KERNEL MODE
3266  030354  012706  001100                  MOV     #KERSTK,KSP     ;RESTORE KERNEL S.P. IN CASE IT CHANGED
3267  030360  005037  177640                  CLR     UIPAR0          ;REMAP USER PAGE 0 TO 0-4K
3268  030364  012737  140000  177776          MOV     #140000,PSW     ;GO TO USER MODE
3269  030372  012706  000700                  MOV     #USESTK,USP     ;RESTORE USER STACK POINTER
3270  030376  005037  177776                  CLR     PSW             ;GO BACK TO KERNEL MODE
3271  030402  012737  002076  000004          MOV     #TIMERR,@#4     ;RESTORE ADDR. OF NORMAL CPU TRAP HANDLER TO 4
3272  030410  012737  030236  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
3273  030416  004737  035150                  JSR     PC,TON          ;TURN T-BIT TRAPPING BACK ON
3274
3275                                  ;;*****************************************************************
3276                                  ;*TEST 40       RTI IN USER MODE DOES NOT CHANGE PSW
3277                                  ;*
3278                                  ;*      THIS TEST CHECKS TO SEE THAT WHEN AN RTI IS EXECUTED IN USER
3279                                  ;*      MODE, THE MODE OR PRIORITY BITS OF THE PSW ARE NOT CHANGED.
3280                                  ;*
3281                                  ;;*****************************************************************
3282  030422  000004                  TST40:  SCOPE
3283
3284  030424  012737  030436  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
3285  030432  012702  170000                  MOV     #170000,R2      ;LOAD ''PRESENT & EXPECTED'' PSW VALUE INTO R2
3286  030436  010237  177776          2$:     MOV     R2,PSW          ;GO TO USER MODE-PRIORITY 0
3287  030442  012746  000340                  MOV     #340,-(SP)      ;PUT A NEW PSW (PRIORITY=7) ON STACK
3288  030446  012746  030454                  MOV     #3$,-(SP)       ;PUT NEW PC ON THE STACK
3289  030452  000002                          RTI                     ;DO AN RTI FROM USER MODE
3290  030454  013701  177776          3$:     MOV     PSW,R1          ;READ NEW PSW INTO R1
3291  030460  042701  007437                  BIC     #7437,R1        ;MASK OFF COND. CODE, T-BIT, AND UNUSED BITS
3292  030464  005037  177776                  CLR     PSW             ;GO BACK TO KERNEL MODE
3293  030470  020201                          CMP     R2,R1           ;DID PSW STAY IN USER, PRIORITY=0?
3294  030472  001401                          BEQ     4$              ;BRANCH IF YES
3295  030474  104060                          ERROR   60              ;PSW CHANGED BY AN RTI FROM USER
3296                                                                  ;FOR A TIGHTER SCOPE LOOP
3297                                                                  ;REPLACE ERROR CALL WITH
3298                                                                  ;'BR=2$'' = 000760
3299  030476  012737  030424  001110  4$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
3300
3301
```

```
                                ;;*****************************************************************
                                ;*TEST 41        KT ERROR SERVICED BEFORE TIMEOUT ERROR
                                ;*
                                ;*      THIS TEST CHECKS TO SEE THAT IF A CERTAIN VIRTUAL ADDRESS THAT
                                ;*      WOULD CAUSE A MEMORY MANAGEMENT ERROR CAUSES A TIMEOUT
                                ;*      ERROR FIRST, THE TIMEOUT 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
                                ;*
                                ;;*****************************************************************
030504  000004                TST41:  SCOPE
030506  012705  077006        1$:     MOV     #77006,R5       ;LOAD PDR7 DATA INTO R5
030512  010537  172316                MOV     R5,KIPDR7       ;MAP PAGE 7 R/W  PLF=176
030516  012737  030544  000004        MOV     #3$,@#4         ;SET CPU TRAP VECTOR TO ADDRESS OF 3$
030524  012737  030546  000250        MOV     #4$,@#250       ;SET M.M. TRAP VECTOR TO ADDRESS OF 4$
030532  012737  030540  001110        MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
030540  005237  177700        2$:     INC     @#177700        ;CAUSE PLF ABORT AND POTENTIAL TIMEOUT
030544  104043                3$:     ERROR   43              ;TRAPPED THRU CPU TRAP VECTOR BUT SHOULDN'T HAVE
                                                              ;FOR TIGHTER SCOPE LOOP
                                                              ;REPLACE ERROR CALL WITH
                                                              ;'BR 2$'' = 000776
030546  012706  001100        4$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER AFTER TRAPPING
030552  013737  177572  001272        MOV     SR0,WASSR0      ;READ STATUS REG.0
030560  013737  177576  001274  5$:   MOV     SR2,WASSR2      ;READ STATUS REG. 2
030566  012700  040017                MOV     #40017,R0       ;LOAD EXPECTED SR0 CONTENTS INTO R0
030572  020037  001272                CMP     R0,WASSR0       ;SR0 PLF ERROR BIT SET?
030576  001401                        BEQ     6$              ;BRANCH IF YES
030600  104044                        ERROR   44              ;SR0 DIDN'T REPORT PLF ERROR
                                                              ;FOR TIGHTER SCOPE LOOP
                                                              ;REPLACE ERROR CALL WITH
                                                              ;'BR 2$'' = 000741
030602  012701  030540        6$:     MOV     #2$,R1          ;LOAD EXPECTED SR2 CONTENTS INTO R1
030606  020137  001274                CMP     R1,WASSR2       ;WAS SR2 LOCKED BY PLF ABORT?
030612  001401                        BEQ     7$              ;BRANCH IF YES
030614  104044                        ERROR   44              ;SR2 DIDN'T LOCK UP VIRTUAL ADDRESS
                                                              ;FOR TIGHTER SCOPE LOOP
                                                              ;REPLACE ERROR CALL WITH
                                                              ;'BR 2$'' = 000741
030616  042737  160000  177572  7$:     BIC     #160000,SR0     ;CLEAR ERROR BITS THAT WERE SET IN SR0
030624  012737  002076  000004        MOV     #TIMERR,@#4     ;RESTORE ADDRESS OF NORMAL CPU TRAP HANDLER
030632  012737  002150  000250        MOV     #MGMERR,@#250   ;RESTORE ADDRESS OF NORMAL M.M. TRAP HANDLER
030640  012737  077406  172316        MOV     #77406,KIPDR7   ;REMAP PAGE 7 TO READ/WRITE PLF=177
030646  012737  030506  001110        MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$


                                ;;*****************************************************************
                                ;*TEST 42        PC & PSW SAVED FOR KT ERROR DURING SERVICE OF TIMEOUT ERROR
                                ;*
                                ;*      THIS TEST CHECKS THE PC AND PROCESSOR STATUS WORD SAVED WHEN
                                ;*      A KT ERROR OCCURS DURING THE SECOND PUSH ON THE STACK DURING
                                ;*      SERVICING OF A TIMEOUT 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
```

```
3358                                    ;*      SHOULD RECORD THE KT ERROR (A R/O VIOLATION BY THE USER STACK PTR.)
3359                                    ;*
3360                                    ;*      NOTE THAT THE PREVIOUS MODE BITS <13:12> OF THE PSW
3361                                    ;*      WILL BE SET IN THE PSW THAT IS SAVED.
3362                                    ;*
3363                                    ;;**********************************************************************
3364  030654  000004                    TST42:  SCOPE
3365  030656  004737  035114            1$:     JSR     PC,TOFF         ;TURN T-BIT TRAPPING OFF FOR THIS TEST
3366  030662  012737  000600  177646            MOV     #600,UIPAR3     ;MAP USER PAGE 3 TO 12-16K
3367  030670  012737  000600  177650            MOV     #600,UIPAR4     ;MAP USER PAGE 4 TO 12-16K
3368  030676  012737  077402  177606            MOV     #77402,UIPDR3   ;MAP USER PAGE 3 READ-ONLY
3369  030704  012737  077406  177610            MOV     #77406,UIPDR4   ;MAP USER PAGE 4 READ/WRITE
3370  030712  012737  030766  000004            MOV     #4$,@#4         ;LOAD ADDRESS OF 4$ IN CPU (TIMEOUT) VECTOR
3371  030720  012737  140017  000006            MOV     #140017,@#6     ;LOAD PSW THAT SHOULD BE PUT ON STACK IN VECTOR+2
3372  030726  012737  030766  000250            MOV     #4$,@#250       ;LOAD ADDRESS OF 4$ IN M.M. TRAP VECTOR
3373  030734  012737  000340  000252            MOV     #340,@#252      ;LOAD A KERNEL PSW IN MMVEC+2
3374  030742  012737  030750  001110            MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
3375  030750  012737  140000  177776  2$:       MOV     #140000,PSW     ;GO TO USER MODE
3376  030756  012706  100002                    MOV     #100002,USP     ;SET USER STACK PTR. SO SECOND PUSH IS IN PG. 3
3377  030762  005737  177700            3$:     TST     @#177700        ;CAUSE TIMEOUT ERROR THAT WILL CAUSE
3378                                                                    ;R/O ERROR WHEN TRY TO SAVE OLD PC
3379  030766  016601  000002            4$:     MOV     2(KSP),R1       ;PUT PSW SAVED ON KERNEL STACK INTO R1
3380  030772  011603                            MOV     (KSP),R3        ;PUT PC SAVED ON KERNEL STACK INTO R3
3381  030774  013737  177572  001272            MOV     SR0,WASSR0      ;READ THE CONTENTS OF M.M. STATUS REG. 0
3382  031002  013737  177576  001274            MOV     SR2,WASSR2      ;READ THE CONTENTS OF M.M. STATUS REG. 2
3383  031010  042737  160000  177572            BIC     #160000,SR0     ;CLEAR THE ERROR BITS IN SR0
3384  031016  005037  177776                    CLR     PSW             ;BE SURE IN KERNEL MODE
3385  031022  012706  001100                    MOV     #KERSTK,KSP     ;RESTORE KERNEL STACK POINTER
3386  031026  012737  140000  177776            MOV     #140000,PSW     ;GO TO USER MODE
3387  031034  012706  000700                    MOV     #USESTK,USP     ;RESTORE USER STACK POINTER
3388  031040  005037  177776                    CLR     PSW             ;GO BACK TO KERNEL MODE
3389  031044  005037  001176                    CLR     $TMP0           ;CLEAR ERROR INDICATOR
3390  031050  020127  170017                    CMP     R1,#170017      ;WAS THE PSW SAVED THE ONE PICKED UP BY THE
3391                                                                    ;TIMEOUT TRAP FROM ERRVEC+2?
3392                                                                    ;VALUE 170017 = PSW FROM LOC. 6 WITH
3393                                                                    ;PREVIOUS MODE BITS = USER
3394  031054  001402                            BEQ     5$              ;BRANCH IF YES
3395  031056  005237  001176                    INC     $TMP0           ;WRONG PSW SAVED DURING "DOUBLE ERROR" SEQUENCE
3396  031062  020327  030766            5$:     CMP     R3,#3$+4        ;WAS THE PC AT THE TIME OF THE TIMEOUT ERROR
3397                                                                    ;SAVED ON THE STACK?
3398  031066  001402                            BEQ     6$              ;BRANCH IF YES
3399  031070  005237  001176                    INC     $TMP0           ;WRONG PC SAVED DURING TRAP SEQUENCE
3400  031074  023727  001272  020147  6$:       CMP     WASSR0,#20147   ;DID SR0 REPORT - USER, PAGE 3, R/O ABORT?
3401  031102  001402                            BEQ     7$              ;BRANCH IF YES
3402  031104  005237  001176                    INC     $TMP0           ;SR0 DID NOT REPORT R/O ABORT
3403  031110  023727  001274  030762  7$:       CMP     WASSR2,#3$      ;DID SR2 LOCK UP VIRTUAL ADDR. OF LAST
3404                                                                    ;INSTRUCTION SUCCESSFULLY FETCHED?
3405  031116  001402                            BEQ     8$              ;BRANCH IF YES
3406  031120  005237  001176                    INC     $TMP0           ;SR2 DID NOT LOCK UP ADDR. OF TIMEOUT INST.
3407  031124  005737  001176            8$:     TST     $TMP0           ;ANY "ERRORS" DURING TRAP SEQUENCE?
3408  031130  001401                            BEQ     9$              ;BRANCH IF NO
3409  031132  104045                            ERROR   45              ;THE WRONG PC OR PSW WERE SAVED
3410                                                                    ;OR SR0 OR SR2 DID NOT REPORT R/O
3411                                                                    ;ERROR DURING TIMEOUT - KT TRAP
3412                                                                    ;SEQUENCE
3413                                                                    ;FOR TIGHTER SCOPE LOOP
```

```
                                                        ;REPLACE ERROR CALL WITH
                                                        ;'BR 2$'' = 000710
031134  012737  002076  000004  9$:     MOV     #TIMERR,@#4     ;RESTORE ADDRESS OF NORMAL CPU TRAP HANDLER
031142  012737  000340  000006          MOV     #340,@#6        ;RELOAD ERRVEC+2 WITH KERNEL PSW
031150  012737  002150  000250          MOV     #MGMERR,@#250   ;RESTORE ADDRESS OF NORMAL M.M. TRAP HANDLER
031156  012737  077406  177606          MOV     #77406,UIPDR3   ;REMAP USER PAGE 3 READ/WRITE
031164  012737  030656  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
031172  004737  035150                  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 43       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$, WHERE THE ERRORS ARE REPORTED.
                                ;*
                                ;;*****************************************************************
031176  000004                  TST43:  SCOPE
031200  005037  172340          1$:     CLR     KIPAR0          ;MAP KERNEL PAGE 0 TO 0-4K
031204  012737  000200  172342          MOV     #200,KIPAR1     ;MAP KERNEL PAGE 1 TO 4-8K
031212  012737  000400  172344          MOV     #400,KIPAR2     ;MAP KERNEL PAGE 2 TO 8-12K
031220  012737  000600  172346          MOV     #600,KIPAR3     ;MAP KERNEL PAGE 3 TO 12-16K
031226  012737  000600  172350          MOV     #600,KIPAR4     ;MAP KERNEL PAGE 4 TO 12-16K
031234  012737  007600  172356          MOV     #7600,KIPAR7    ;MAP KERNEL PAGE 7 TO THE I/O PAGE
031242  012700  077406                  MOV     #77406,R0       ;MAKE ALL KERNEL I-SPACE PAGES RESIDENT
                                                                ;READ/WRITE, LENGTH 200 BLOCKS
031246  012702  000010                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
031252  012701  172300                  MOV     #KIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
031256  010021                  2$:     MOV     R0,(R1)+        ;LOAD PDR WITH 77406
031260  077202                          SOB     R2,2$           ;LOOP TO 2$ UNTIL ALL PDRS LOADED
031262  012702  000010                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
031266  012701  177600                  MOV     #UIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
031272  010021                  3$:     MOV     R0,(R1)+        ;LOAD PDR WITH 77406
031274  077202                          SOB     R2,3$           ;LOOP TO 3$ UNTIL ALL PDRS LOADED
031276  012737  000000  177640          MOV     #000,UIPAR0     ;MAP USER I PAGE 0 TO 0-4K
031304  012737  000200  177642          MOV     #200,UIPAR1     ;MAP USER I PAGE 1 TO 4-8K
031312  012737  000400  177644          MOV     #400,UIPAR2     ;MAP USER I PAGE 2 TO 8-12K
031320  012737  000600  177646          MOV     #600,UIPAR3     ;MAP USER I PAGE 3 TO 12-16K
031326  012737  007600  177656          MOV     #7600,UIPAR7    ;MAP USER I PAGE 7 TO THE I/O PAGE
031334  012737  031342  001110          MOV     #4$,$LPERR      ;SET LOOP ON ERROR TO 4$
031342                  4$:
031342  012737  077406  172310          MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
031350  012737  000600  172350          MOV     #600,KIPAR4     ;MAP KERNEL I PAGE 4 TO 12K
031356  012737  000600  177650          MOV     #600,UIPAR4     ;MAP USER I PAGE 4 TO 12K
031364  012700  036514                  MOV     #36514,R0       ;LOAD DATA PATTERN INTO R0
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3470  031370  010037  100000                    MOV     R0,@#100000     ;LOAD DATA PATTERN INTO PHY 60000
3471  031374  012737  031776  000250            MOV     #23$,MMVEC      ;SET M.M. VECTOR TO 23$
3472  031402  105037  172310                    CLRB    KIPDR4          ;MAKE KERNEL I-SPACE PAGE 4 NON-RESIDENT
3473                                            ;THE FOLLOWING WILL TEST DSTM=0 MFPI
3474                                            ;
3475  031406  012737  031414  001110            MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
3476  031414  012737  030340  177776  5$:       MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3477  031422  006506                    6$:     MFPI    USP             ;PUT USER STACK POINTER ON KERNEL
3478                                            ;STACK
3479  031424  022706  001100                    CMP     #KERSTK,KSP     ;WAS SOMETHING PUSHED ON STACK AT 6$
3480  031430  001407                            BEQ     7$              ;BRANCH IF NOTHING WAS PUSHED
3481  031432  012600                            MOV     (KSP)+,R0       ;POP KERNEL STACK INTO R0
3482  031434  012701  000700                    MOV     #USESTK,R1      ;EXPECTING TO GET 700 AS USP
3483  031440  020001                            CMP     R0,R1           ;DID YOU GET THE RIGHT POINTER?
3484  031442  001403                            BEQ     8$              ;BRANCH IF YOU DID
3485  031444  104046                            ERROR   46              ;WRONG THING WAS PUSHED ON STACK
3486                                                                    ;FOR TIGHTER SCOPE LOOP
3487                                                                    ;REPLACE ERROR CALL WITH
3488                                                                    ;'BR 5$'' = 000763
3489  031446  000401                            BR      8$              ;BRANCH TO NEXT TRY
3490  031450  104050                    7$:     ERROR   50              ;NOTHING PUSHED ON STACK
3491                                                                    ;FOR TIGHTER SCOPE LOOP
3492                                                                    ;REPLACE ERROR CALL WITH
3493                                                                    ;'BR 5$'' = 000761
3494  031452                            8$:     ;THE FOLLOWING WILL TEST DSTM=1 MFPI.
3495  031452  012737  031464  001110            MOV     #9$,$LPERR      ;SET LOOP ON ERROR POINTER TO 9$
3496  031460  012700  036514                    MOV     #36514,R0       ;RELOAD DATA PATTERN IN R0
3497  031464  012737  030340  177776  9$:       MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3498  031472  012702  100000                    MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
3499  031476  006512                            MFPI    (R2)            ;READ FROM PHYSICAL 60000
3500  031500  012601                            MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
3501  031502  020001                            CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
3502  031504  001401                            BEQ     10$             ;BRANCH IF CORRECT DATA WAS FETCHED
3503  031506  104046                            ERROR   46              ;WRONG DATA WAS FETCHED
3504                                                                    ;FOR TIGHTER SCOPE LOOP
3505                                                                    ;REPLACE ERROR CALL WITH
3506                                                                    ;'BR 9$'' = 000766
3507  031510                            10$:    ;THE FOLLOWING WILL TEST DSTM=2 MFPI.
3508  031510  012737  031516  001110            MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
3509  031516  012737  030340  177776  11$:      MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3510  031524  012702  100000                    MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
3511  031530  006522                            MFPI    (R2)+           ;READ FROM PHYSICAL 60000
3512  031532  012601                            MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
3513  031534  020001                            CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
3514  031536  001401                            BEQ     12$             ;BRANCH IF CORRECT DATA WAS FETCHED
3515  031540  104046                            ERROR   46              ;WRONG DATA WAS FETCHED
3516                                                                    ;FOR TIGHTER SCOPE LOOP
3517                                                                    ;REPLACE ERROR CALL WITH
3518                                                                    ;'BR 11$'' = 000766
3519  031542                            12$:    ;THE FOLLOWING WILL TEST DSTM=3 MFPI.
3520  031542  012737  031550  001110            MOV     #13$,$LPERR     ;SET LOOP ON ERROR POINTER TO 13$
3521  031550  012737  030340  177776  13$:      MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3522  031556  006537  100000                    MFPI    @#100000        ;READ FROM PHYSICAL 60000
3523  031562  012601                            MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
3524  031564  020001                            CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
3525  031566  001401                            BEQ     14$             ;BRANCH IF CORRECT DATA WAS FETCHED
```

```
3526  031570  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
3527                                                                  ;FOR TIGHTER SCOPE LOOP
3528                                                                  ;REPLACE ERROR CALL WITH
3529                                                                  ;'BR 13$'' = 000767
3530  031572                          14$:    ;THE FOLLOWING WILL TEST DSTM=4 MFPI.
3531  031572  012737  031600  001110          MOV     #15$,$LPERR     ;SET LOOP ON ERROR POINTER TO 15$
3532  031600  012737  030340  177776  15$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3533  031606  012702  100002                  MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
3534  031612  006542                          MFPI    -(R2)           ;READ FROM PHYSICAL 60000
3535  031614  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
3536  031616  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
3537  031620  001401                          BEQ     16$             ;BRANCH IF CORRECT DATA WAS FETCHED
3538  031622  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
3539                                                                  ;FOR TIGHTER SCOPE LOOP
3540                                                                  ;REPLACE ERROR CALL WITH
3541                                                                  ;'BR 15$'' = 000766
3542  031624                          16$:
3543                                          ;THE FOLLOWING WILL TEST DSTM=5 MFPI.
3544                                          ;
3545  031624  012737  031632  001110          MOV     #17$,$LPERR     ;SET LOOP ON ERROR POINTER TO 17$
3546  031632  012737  030340  177776  17$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3547  031640  012737  100000  001202          MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR INTO LOC. $TMP2
3548  031646  012702  001204                  MOV     #<$TMP2+2>,R2   ;LOAD ADDR. OF $TMP2+2 INTO R2
3549  031652  006552                          MFPI    @-(R2)          ;READ FROM PHYSICAL 60000
3550  031654  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
3551  031656  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
3552  031660  001401                          BEQ     18$             ;BRANCH IF CORRECT DATA WAS FETCHED
3553  031662  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
3554                                                                  ;FOR TIGHTER SCOPE LOOP
3555                                                                  ;REPLACE ERROR CALL WITH
3556                                                                  ;'BR 17$'' = 000763
3557  031664                          18$:    ;THE FOLLOWING WILL TEST DSTM=6 MFPI.
3558                                          ;
3559  031664  012737  031672  001110          MOV     #19$,$LPERR     ;SET LOOP ON ERROR POINTER TO 19$
3560  031672  012737  030340  177776  19$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3561  031700  005002                          CLR     R2              ;MAKE REGISTER 2 A ZERO
3562  031702  006562  100000                  MFPI    100000(R2)      ;READ FROM PHYSICAL 60000
3563  031706  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
3564  031710  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
3565  031712  001401                          BEQ     20$             ;BRANCH IF CORRECT DATA WAS FETCHED
3566  031714  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
3567                                                                  ;FOR TIGHTER SCOPE LOOP
3568                                                                  ;REPLACE ERROR CALL WITH
3569                                                                  ;'BR 19$'' = 000766
3570  031716                          20$:    ;THE FOLLOWING WILL TEST DSTM=7 MFPI.
3571                                          ;
3572  031716  012737  031724  001110          MOV     #21$,$LPERR     ;SET LOOP ON ERROR POINTER TO 21$
3573  031724  012737  030340  177776  21$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3574  031732  012737  100000  001202          MOV     #100000,$TMP2   ;LOAD TEST LOC. V.A. INTO $TMP2
3575  031740  012702  001202                  MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
3576  031744  006572  000000                  MFPI    @0(R2)          ;USE $TMP2 TO FETCH VIRTUAL
3577                                                                  ;ADDRESS OF 60000
3578  031750  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
3579  031752  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
3580  031754  001401                          BEQ     22$             ;BRANCH IF CORRECT DATA WAS FETCHED
3581  031756  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
```

```
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;'BR 21$'' = 000762
031760  012737  002150  000250  22$:    MOV     #MGMERR,MMVEC   ;SET M.M. VECTOR TO NORMAL ROUTINE
031766  012737  031200  001110          MOV     #1$,$LPERR      ;SET LOOP POINTER TO START OF TEST
031774  000423                        BR      TST44           ;;BRANCH TO NEXT TEST

031776  012637  001266  23$:    MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
032002  012637  001270          MOV     (KSP)+,TRAPPS
032006  013737  177572  001272  MOV     SR0,WASSR0      ;SAVE SR0 FOR ERROR TYPEOUT
032014  013737  177576  001274  MOV     SR2,WASSR2      ;SAVE SR2 FOR ERROR TYPEOUT
032022  042737  160000  177572  BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0 AND LEAVE
032030  104051                  ERROR   51              ;TRIED TO READ NON-RESIDENT PAGE
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;A 'NOP'' = 000240
032032  013746  001270          MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
032036  013746  001266          MOV     TRAPPC,-(KSP)
032042  000002                  RTI

                        ;;**********************************************************************
                        ;*TEST 44        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$, WHERE THE ERRORS ARE REPORTED.
                        ;*
                        ;;**********************************************************************
032044  000004         TST44:  SCOPE
032046  012737  077406  172310  1$:     MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
032054  012737  077406  177610          MOV     #77406,UIPDR4   ;USER I-SPACE PAGE 4 READ/WRITE
032062  012737  000600  172350          MOV     #600,KIPAR4     ;MAP KERNEL I PAGE 4 TO 12K
032070  012737  000600  177650          MOV     #600,UIPAR4     ;MAP USER I PAGE 4 TO 12K
032076  012737  032656  000250          MOV     #20$,MMVEC      ;SET M.M. VECTOR TO 20$
                                        ;THE FOLLOWING WILL TEST DSTM=0 MTPI
                                        ;
032104  012737  030340  177776  2$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
032112  012746  007777                  MOV     #7777,-(KSP)    ;PUSH DATA ON KERNEL STACK
032116  006606                        MTPI    USP             ;LOAD USER STACK POINTER
032120  006506                        MFPI    USP             ;READ USER STACK POINTER
032122  012601                        MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
032124  022701  007777                CMP     #7777,R1        ;WAS USER STACK POINTER CHANGED
032130  001401                        BEQ     3$              ;BRANCH IF IT WAS
032132  104050                        ERROR   50              ;USER STACK POINTER NOT CHANGED
                                                        ;FOR TIGHTER SCOPE LOOP
                                                        ;REPLACE ERROR CALL WITH
                                                        ;'BR 2$'' = 000764
032134  012737  030340  177776  3$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
032142  012746  000700                  MOV     #USESTK,-(KSP)  ;GET READY TO RESTORE USER S. POINT
032146  006606                        MTPI    USP             ;RESTORE USER STACK POINTER
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3638  032150                                4$:     ;THIS WILL TEST DSTM = 1 MTPI.
3639  032150  012737  032166  001110                MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
3640  032156  012702  100000                        MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
3641  032162  012700  125252                        MOV     #125252,R0      ;LOAD TEST DATA INTO R0
3642  032166  010046                        5$:     MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
3643  032170  105037  172310                        CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
3644  032174  006612                                MTPI    (R2)            ;LOAD TEST DATA INTO PHYSICAL 60000
3645  032176  112737  000006  172310                MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
3646  032204  011201                                MOV     (R2),R1         ;READ FROM ADDRESS 60000
3647  032206  020001                                CMP     R0,R1           ;SEE IF DATA WAS STORED AT CORRECT PLACE
3648  032210  001401                                BEQ     6$              ;BRANCH IF STORE WAS CORRECT
3649  032212  104047                                ERROR   47              ;INCORRECT STORE
3650                                                                        ;FOR TIGHTER SCOPE LOOP
3651                                                                        ;REPLACE ERROR CALL WITH
3652                                                                        ;'BR 5$' = 000765
3653  032214                                6$:     ;THE FOLLOWING WILL TEST DSTM=2 MTPI.
3654                                                ;
3655  032214  012737  032240  001110                MOV     #8$,$LPERR      ;SET LOOP ON ERROR POINTER TO 8$
3656  032222  012737  030340  177776                MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3657  032230  012700  125252                        MOV     #125252,R0      ;LOAD TEST DATA INTO R0
3658  032234  012702  100000                        MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
3659  032240  010046                        8$:     MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
3660  032242  105037  172310                        CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
3661  032246  006612                                MTPI    (R2)            ;LOAD TEST DATA INTO PHYSICAL 60000
3662  032250  112737  000006  172310                MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESISENT
3663  032256  013701  100000                        MOV     @#100000,R1     ;READ FROM ADDRESS 60000
3664  032262  020001                                CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
3665  032264  001401                                BEQ     9$              ;BRANCH IF STORE WAS CORRECT
3666  032266  104047                                ERROR   47              ;INCORRECT STORE
3667                                                                        ;FOR TIGHTER SCOPE LOOP
3668                                                                        ;REPLACE ERROR CALL WITH
3669                                                                        ;'BR 8$' = 000764
3670  032270                                9$:     ;THIS WILL TEST DSTM = 3 MTPI.
3671  032270  012737  032310  001110                MOV     #10$,$LPERR     ;SET LOOP ON ERROR POINTER TO 10$
3672  032276  012737  030340  177776                MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3673  032304  012700  052525                        MOV     #52525,R0       ;LOAD TEST DATA INTO R0
3674  032310  010046                        10$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
3675  032312  105037  172310                        CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
3676  032316  006637  100000                        MTPI    @#100000        ;LOAD TEST DATA INTO PHYSICAL 60000
3677  032322  112737  000006  172310                MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
3678  032330  013701  100000                        MOV     @#100000,R1     ;READ FROM ADDRESS 60000
3679  032334  020001                                CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
3680  032336  001401                                BEQ     11$             ;BRANCH IF STORE WAS CORRECT
3681  032340  104047                                ERROR   47              ;INCORRECT STORE
3682                                                                        ;FOR TIGHTER SCOPE LOOP
3683                                                                        ;REPLACE ERROR CALL WITH
3684                                                                        ;'BR 10$' = 000763
3685  032342                                11$:    ;THIS WILL TEST DSTM = 4 MTPI.
3686  032342  012737  032362  001110                MOV     #12$,$LPERR     ;SET LOOP ON ERROR POINTER TO 12$
3687  032350  012737  030340  177776                MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3688  032356  012700  125252                        MOV     #125252,R0      ;LOAD TEST DATA INTO R0
3689  032362  010046                        12$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
3690  032364  012702  100002                        MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
3691  032370  105037  172310                        CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
3692  032374  006642                                MTPI    -(R2)           ;LOAD TEST DATA INTO PHYSICAL 60000
3693  032376  112737  000006  172310                MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
```

```
3694  032404  013701  100000          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
3695  032410  020001                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
3696  032412  001401                  BEQ     13$             ;BRANCH IF STORE WAS CORRECT
3697  032414  104047                  ERROR   47              ;INCORRECT STORE
3698                                                          ;FOR TIGHTER SCOPE LOOP
3699                                                          ;REPLACE ERROR CALL WITH
3700                                                          ;'BR 12$' = 000762
3701  032416                  13$:    ;THE FOLLOWING WILL TEST DSTM=5 MTPI.
3702                                  ;
3703  032416  012737  032450  001110  MOV     #14$,$LPERR     ;SET LOOP ON ERROR POINTER TO 14$
3704  032424  012737  030340  177776  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3705  032432  012700  052525          MOV     #52525,R0       ;LOAD TEST DATA INTO R0
3706  032436  012702  001204          MOV     #<$TMP2+2>,R2   ;LOAD ADDR. OF LOC. $TMP2+2 INTO R2
3707  032442  012737  100000  001202  MOV     #100000,$TMP2   ;LOAD VIRT. ADDR. OF TEST LOC. INTO $TMP2
3708  032450  010046          14$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
3709  032452  105037  172310          CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
3710  032456  006652                  MTPI    @-(R2)          ;LOAD TEST DATA INTO PHYSICAL 60000
3711  032460  112737  000006  172310  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
3712  032466  013701  100000          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
3713  032472  020001                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
3714  032474  001401                  BEQ     15$             ;BRANCH IF STORE WAS CORRECT
3715  032476  104047                  ERROR   47              ;INCORRECT STORE
3716                                                          ;FOR TIGHTER SCOPE LOOP
3717                                                          ;REPLACE ERROR CALL WITH
3718                                                          ;'BR 14$' = 000764
3719  032500                  15$:    ;THIS WILL TEST DSTM = 6 MTPI.
3720                                  ;
3721  032500  012737  032522  001110  MOV     #16$,$LPERR     ;SET LOOP ON ERROR POINTER TO 16$
3722  032506  012737  030340  177776  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3723  032514  012700  052525          MOV     #52525,R0       ;LOAD TEST DATA INTO R0
3724  032520  005002                  CLR     R2              ;MAKE REGISTER 2 ZERO
3725  032522  010046          16$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
3726  032524  105037  172310          CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
3727  032530  006662  100000          MTPI    100000(R2)      ;LOAD TEST DATA INTO PHYSICAL 60000
3728  032534  112737  000006  172310  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
3729  032542  013701  100000          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
3730  032546  020001                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
3731  032550  001401                  BEQ     17$             ;BRANCH IF STORE WAS CORRECT
3732  032552  104047                  ERROR   47              ;INCORRECT STORE
3733                                                          ;FOR TIGHTER SCOPE LOOP
3734                                                          ;REPLACE ERROR CALL WITH
3735                                                          ;'BR 16$' = 000763
3736  032554                  17$:    ;THE FOLLOWING WILL TEST DSTM=7 MTPI.
3737                                  ;
3738  032554  012737  032606  001110  MOV     #18$,$LPERR     ;SET LOOP ON ERROR POINTER TO 18$
3739  032562  012737  030340  177776  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
3740  032570  012700  125252          MOV     #125252,R0      ;LOAD TEST DATA INTO R0
3741  032574  012737  100000  001202  MOV     #100000,$TMP2   ;LOAD VIRT. ADDR. OF TEST LOCATION
3742                                                          ;INTO LOCATION $TMP2
3743  032602  012702  001202          MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
3744  032606  010046          18$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
3745  032610  105037  172310          CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
3746  032614  006672  000000          MTPI    @0(R2)          ;LOAD TEST DATA INTO PHYSICAL 60000
3747  032620  112737  000006  172310  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
3748  032626  013701  100000          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
3749  032632  020001                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
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3750  032634  001401                        BEQ     19$             ;BRANCH IF STORE WAS CORRECT
3751  032636  104047                        ERROR   47              ;INCORRECT STORE
3752                                                                ;FOR TIGHTER SCOPE LOOP
3753                                                                ;REPLACE ERROR CALL WITH
3754                                                                ;'BR 18$'' = 000763
3755  032640  012737  032046  001110  19$:  MOV     #1$,$LPERR      ;SET LOOP POINTER TO START OF TEST
3756  032646  012737  002150  000250        MOV     #MGMERR,MMVEC   ;RESTORE M.M. VECTOR TO NORMAL ROUTINE
3757  032654  000423                        BR      TST45           ;;BRANCH TO NEXT TEST
3758
3759
3760  032656  012637  001266        20$:    MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
3761  032662  012637  001270                MOV     (KSP)+,TRAPPS
3762  032666  013737  177572  001272        MOV     SR0,WASSR0      ;SAVE SR0 FOR ERROR TYPEOUT
3763  032674  013737  177576  001274        MOV     SR2,WASSR2      ;SAVE SR2 FOR ERROR TYPEOUT
3764  032702  042737  160000  177572        BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
3765  032710  104051                        ERROR   51              ;TRIED TO LOAD A N.R. PAGE 4
3766                                                                ;FOR TIGHTER SCOPE LOOP
3767                                                                ;REPLACE ERROR CALL WITH
3768                                                                ;A 'NOP'' = 000240
3769  032712  013746  001270                MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
3770  032716  013746  001266                MOV     TRAPPC,-(KSP)
3771  032722  000002                        RTI                     ;RETURN TO TEST
3772
3773
3774
3775                          ;;*****************************************************************
3776                          ;*TEST 45       MOVE FROM PREVIOUS (KERNEL) I-SPACE TO USER MODE
3777                          ;*
3778                          ;*      THIS TEST CHECKS THAT IF THE PREVIOUS MODE IS KERNEL THE
3779                          ;*      FETCH IS FROM KERNEL SPACE.
3780                          ;*      THERE IS A DESCRIPTION BEFORE EACH DESTINATION MODE TESTED.
3781                          ;*
3782                          ;*
3783                          ;*      IF THE CORRECT MODE IS NOT ENABLED A NON-RESIDENT ABORT
3784                          ;*      WILL OCCUR AND TRAP TO 21$, WHERE THE ERRORS ARE REPORTED.
3785                          ;*
3786                          ;;*****************************************************************
3787  032724  000004          TST45:  SCOPE
3788  032726  012700  077406  1$:     MOV     #77406,R0       ;MAKE ALL USER I-SPACE PAGES RESIDENT
3789                                                          ;READ/WRITE, LENGTH 200 BLOCKS
3790  032732  012702  000010          MOV     #10,R2          ;SET LOOP COUNTER TO 8
3791  032736  012701  177600          MOV     #UIPDR0,R1      ;LOAD ADDRESS OF FIRST PDR IN R1
3792  032742  010021          2$:     MOV     R0,(R1)+        ;LOAD PDR WITH 77406
3793  032744  077202                  SOB     R2,2$           ;LOOP UNTIL 8 USER PDRS LOADED
3794  032746  012737  032754  001110  MOV     #3$,$LPERR      ;SET LOOP ON ERROR TO 3$
3795  032754  012737  140340  177776  3$:     MOV     #140340,PSW     ;GO TO USER MODE FOR THIS TEST
3796  032762  012737  077406  172310  MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
3797  032770  012737  000600  172350  MOV     #600,KIPAR4     ;MAP KERNEL I PAGE 4 TO 12K
3798  032776  012737  000600  177650  MOV     #600,UIPAR4     ;MAP USER I PAGE 4 TO 12K
3799  033004  012700  036514          MOV     #36514,R0       ;LOAD DATA PATTERN INTO R0
3800  033010  010037  100000          MOV     R0,@#100000     ;LOAD DATA PATTERN INTO PHY 60000
3801  033014  012702  100000          MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
3802                                  ;THE FOLLOWING WILL TEST DSTM=0 MFPI
3803                                  ;
3804  033020  012737  033422  000250  MOV     #21$,MMVEC      ;SET M.M. VECTOR TO 21$
3805  033026  105037  177610          CLRB    UIPDR4          ;MAKE USER I-SPACE PAGE 4 NON-RESIDENT
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3806  033032  012737  140340  177776          MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
3807  033040  006506                  4$:     MFPI    KSP             ;PUT KERNEL STACK POINTER ON USER STACK
3808  033042  022706  000700                  CMP     #USESTK,USP     ;WAS SOMETHING PUSHED ON STACK AT 1$
3809  033046  001407                          BEQ     5$              ;BRANCH IF NOTHING WAS PUSHED
3810  033050  012600                          MOV     (USP)+,R0       ;POP USER STACK INTO R0
3811  033052  012701  001100                  MOV     #KERSTK,R1      ;EXPECTING 1100 AS KSP
3812  033056  020001                          CMP     R0,R1           ;DID YOU GET THE RIGHT POINTER?
3813  033060  001403                          BEQ     6$              ;BRANCH IF YOU DID
3814  033062  104046                          ERROR   46              ;WRONG THING WAS PUSHED ON STACK
3815                                                                  ;FOR TIGHTER SCOPE LOOP
3816                                                                  ;REPLACE ERROR CALL WITH
3817                                                                  ;'BR 4$'' = 000766
3818  033064  000401                          BR      6$              ;BRANCH TO NEXT TRY
3819  033066  104050                  5$:     ERROR   50              ;NOTHING PUSHED ON STACK
3820                                                                  ;FOR TIGHTER SCOPE LOOP
3821                                                                  ;REPLACE ERROR CALL WITH
3822                                                                  ;'BR 4$'' = 000764
3823  033070                          6$:     ;THE FOLLOWING WILL TEST DSTM=1 MFPI.
3824  033070  012737  033076  001110          MOV     #7$,$LPERR      ;SET LOOP ON ERROR POINTER TO 7$
3825  033076  012737  140340  177776  7$:     MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
3826  033104  012700  036514                  MOV     #36514,R0       ;LOAD DATA EXPECTED INTO R0
3827  033110  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
3828  033114  006512                          MFPI    (R2)            ;READ FROM PHYSICAL 60000
3829  033116  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
3830  033120  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
3831  033122  001401                          BEQ     8$              ;BRANCH IF CORRECT DATA WAS FETCHED
3832  033124  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
3833                                                                  ;FOR TIGHTER SCOPE LOOP
3834                                                                  ;REPLACE ERROR CALL WITH
3835                                                                  ;'BR 7$'' = 000764
3836  033126                          8$:     ;THE FOLLOWING WILL TEST DSM=2 MFPI.
3837  033126  012737  033134  001110          MOV     #9$,$LPERR      ;SET LOOP ON ERROR POINTER TO 9$
3838  033134  012737  140340  177776  9$:     MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
3839  033142  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
3840  033146  006522                          MFPI    (R2)+           ;READ FROM PHYSICAL 60000
3841  033150  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
3842  033152  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
3843  033154  001401                          BEQ     10$             ;BRANCH IF CORRECT DATA WAS FETCHED
3844  033156  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
3845                                                                  ;FOR TIGHTER SCOPE LOOP
3846                                                                  ;REPLACE ERROR CALL WITH
3847                                                                  ;'BR 9$'' = 000766
3848  033160                          10$:    ;THE FOLLOWING WILL TEST DSTM=3 MFPI.
3849  033160  012737  033166  001110          MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
3850  033166  012737  140340  177776  11$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
3851  033174  006537  100000                  MFPI    @#100000        ;READ FROM PHYSICAL 60000
3852  033200  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
3853  033202  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
3854  033204  001401                          BEQ     12$             ;BRANCH IF CORRECT DATA WAS FETCHED
3855  033206  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
3856                                                                  ;FOR TIGHTER SCOPE LOOP
3857                                                                  ;REPLACE ERROR CALL WITH
3858                                                                  ;'BR 11$'' = 000767
3859  033210                          12$:    ;THE FOLLOWING WILL TEST DSTM=4 MFPI.
3860  033210  012737  033216  001110          MOV     #13$,$LPERR     ;SET LOOP ON ERROR POINTER TO 13$
3861  033216  012737  140340  177776  13$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE DERNEL PRESENT USER
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3862  033224  012702  100002                  MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
3863  033230  006542                          MFPI    -(R2)           ;READ FROM PHYSICAL 60000
3864  033232  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
3865  033234  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
3866  033236  001401                          BEQ     14$             ;BRANCH IF CORRECT DATA WAS FETCHED
3867  033240  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
3868                                                                  ;FOR TIGHTER SCOPE LOOP
3869                                                                  ;REPLACE ERROR CALL WITH
3870                                                                  ;'BR 13$'' = 000766
3871  033242                          14$:    ;THE FOLLOWING WILL TEST DSTM=5 MFPI.
3872                                          ;
3873  033242  012737  033250  001110          MOV     #15$,$LPERR     ;SET LOOP ON ERROR POINTER TO 15$
3874  033250  012737  140340  177776  15$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
3875  033256  012737  100000  001202          MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR INTO LOC. $TMP2
3876  033264  012702  001204                  MOV     #<$TMP2+2>,R2   ;LOAD ADDRESS OF $TMP2+2 INTO R2
3877  033270  006552                          MFPI    @-(R2)          ;READ FROM PHYSICAL 60000
3878  033272  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
3879  033274  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
3880  033276  001401                          BEQ     16$             ;BRANCH IF CORRECT DATA FETCHED
3881  033300  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
3882                                                                  ;FOR TIGHTER SCOPE LOOP
3883                                                                  ;REPLACE ERROR CALL WITH
3884                                                                  ;'BR 15$'' = 000763
3885  033302                          16$:    ;THE FOLLOWING WILL TEST DSTM=6 MFPI.
3886                                          ;
3887  033302  012737  033310  001110          MOV     #17$,$LPERR     ;SET LOOP ON ERROR POINTER TO 17$.
3888  033310  012737  140340  177776  17$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
3889  033316  005002                          CLR     R2              ;MAKE REGISTER 2 A ZERO
3890  033320  006562  100000                  MFPI    100000(R2)      ;READ FROM PHYSICAL 60000
3891  033324  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
3892  033326  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
3893  033330  001401                          BEQ     18$             ;BRANCH IF CORRECT DATA FETCHED
3894  033332  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
3895                                                                  ;FOR TIGHTER SCOPE LOOP
3896                                                                  ;REPLACE ERROR CALL WITH
3897                                                                  ;'BR 17$'' = 000766
3898  033334                          18$:    ;THE FOLLOWING WILL TEST DSTM=7 MFPI.
3899                                          ;
3900  033334  012737  033342  001110          MOV     #19$,$LPERR     ;SET LOOP ON ERROR POINTER TO 19$
3901  033342  012737  140340  177776  19$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
3902  033350  012737  100000  001202          MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR. INTO $TMP2
3903  033356  012702  001202                  MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
3904  033362  006572  000000                  MFPI    @0(R2)          ;READ FROM PHYSICAL 60000
3905  033366  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
3906  033370  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
3907  033372  001401                          BEQ     20$             ;BRANCH IF CORRECT DATA FETCHED
3908  033374  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
3909                                                                  ;FOR TIGHTER SCOPE LOOP
3910                                                                  ;REPLACE ERROR CALL WITH
3911                                                                  ;'BR 19$'' = 000762
3912  033376  012737  002150  000250  20$:    MOV     #MGMERR,MMVEC   ;SET M.M. VECTOR TO NORMAL ROUTINE
3913  033404  012737  000340  177776          MOV     #00340,PSW      ;GO BACK TO KERNEL MODE, PREVIOUS KERNEL
3914  033412  012737  032726  001110          MOV     #1$,$LPERR      ;SET LOOP POINTER TO START OF TEST
3915  033420  000423                          BR      TST46           ;;BRANCH TO NEXT TEXT
3916
3917
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3918  033422  012637  001266          21$:    MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
3919  033426  012637  001270                  MOV     (KSP)+,TRAPPS
3920  033432  013737  177572  001272          MOV     SR0,WASSR0      ;SAVE SR0 FOR ERROR TYPEOUT
3921  033440  013737  177576  001274          MOV     SR2,WASSR2      ;SAVE SR2 FOR ERROR TYPEOUT
3922  033446  042737  160000  177572          BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
3923  033454  104051                          ERROR   51              ;TRIED TO READ NON-RESIDENT PAGE
3924                                                                  ;FOR TIGHTER SCOPE LOOP
3925                                                                  ;REPLACE ERROR CALL WITH
3926                                                                  ;A 'NOP' = 000240
3927  033456  013746  001270                  MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
3928  033462  013746  001266                  MOV     TRAPPC,-(KSP)
3929  033466  000002                          RTI                     ;RETURN TO TEST
3930
3931                                  ;;*****************************************************************
3932                                  ;*TEST 46       MOVE FROM/TO D-SPACE = MOVE FROM/TO I-SPACE
3933                                  ;*
3934                                  ;*      THIS TEST CHECKS THAT SINCE THERE IS NO DISTINCTION
3935                                  ;*      BETWEEN INSTRUCTION AND DATA SPACE IN THE FONZ-11
3936                                  ;*      MFPD & MTPD SHOULD BE DECODED THE SAME AS MFPI & MTPI.
3937                                  ;*
3938                                  ;;*****************************************************************
3939  033470  000004                  TST46:  SCOPE
3940  033472  012737  030340  177776  1$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE=USER,CURRENT=KERNEL
3941  033500  106506                          MFPD    USP             ;MFPD SHOULD ACT LIKE MFPI PUTTING
3942                                                                  ;USER STACK POINTER ON THE KERNEL STACK
3943  033502  022706  001100                  CMP     #KERSTK,KSP     ;WAS SOMETHING PUSHED ON KERNEL STACK?
3944  033506  001407                          BEQ     2$              ;BRANCH IF NO
3945  033510  012600                          MOV     (KSP)+,R0       ;POP KERNEL STACK INTO R0
3946  033512  012701  000700                  MOV     #USESTK,R1      ;EXPECTING TO GET 700 AS USP
3947  033516  020001                          CMP     R0,R1           ;DID GET RIGHT POINTER VALUE?
3948  033520  001403                          BEQ     3$              ;BRANCH IF YES
3949  033522  104053                          ERROR   53              ;WRONG THING WAS PUSHED ON STACK
3950                                                                  ;FOR TIGHTER SCOPE LOOP
3951                                                                  ;REPLACE ERROR CALL WITH
3952                                                                  ;'BR 1$' = 000763
3953  033524  000401                          BR      3$              ;BRANCH TO NEXT TRY
3954  033526  104054                  2$:     ERROR   54              ;NOTHING PUSHED ON STACK
3955                                                                  ;FOR TIGHTER SCOPE LOOP
3956                                                                  ;REPLACE ERROR CALL WITH
3957                                                                  ;'BR 1$' = 000761
3958  033530  012737  033536  001110  3$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
3959  033536  012746  007777          4$:     MOV     #7777,-(KSP)    ;PUSH DATA ON KERNEL STACK
3960  033542  106606                          MTPD    USP             ;LOAD THE USER STACK POINTER
3961  033544  106506                          MFPD    USP             ;READ USER STACK POINTER
3962  033546  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
3963  033550  022701  007777                  CMP     #7777,R1        ;WAS USER STACK POINTER CHANGED?
3964  033554  001401                          BEQ     5$              ;BRANCH IF YES
3965  033556  104054                          ERROR   54              ;USER STACK POINTER NOT CHANGED
3966                                                                  ;FOR TIGHTER SCOPE LOOP
3967                                                                  ;REPLACE ERROR CALL WITH
3968                                                                  ;'BR 4$' = 000767
3969  033560  012746  000700          5$:     MOV     #USESTK,-(KSP)  ;GET READY TO RESTORE USER STK. PTR.
3970  033564  106606                          MTPD    USP             ;RESTORE USER STACK POINTER
3971  033566  012737  033472  001110          MOV     #1$,$LPERR      ;SET LOOP POINTER TO START OF TEST
3972
3973                                  ;;*****************************************************************
```

```
                                ;*TEST 47       MOVE FROM PREVIOUS I=SPACE (PREVIOUS=CURRENT=KERNEL)
                                ;*
                                ;*      THIS TEST CHECKS THAT IF BOTH PREVIOUS AND CURRENT MODES
                                ;*      ARE KERNEL, AND THE SOURCE MODE IS 0, THE DESTINATION
                                ;*      STACK IS NOT DECREMENTED BEFORE ACCESS.
                                ;*      'MFPI KSP'' SHOULD PUSH THE NON-DECREMENTED VALUE
                                ;*      OF KSP (1100) ONTO THE STACK (AT LOC. 1076).
                                ;;*****************************************************************
033574  000004                  TST47:  SCOPE
033576  005037  177776          1$:     CLR     @#PSW           ;SET PREVIOUS = CURRENT = KERNEL
033602  012700  001100                  MOV     #STACK,R0       ;SETUP VALUE FOR STACK POINTER
033606  010006                          MOV     R0,KSP          ;LOAD STACK POINTER
033610  006506                          MFPI    KSP             ;THE VALUE ''STACK'' SHOULD BE PUSHED
                                                                ;BEFORE BEING DECREMENTED
033612  011601                          MOV     (KSP),R1        ;READ DATA WHICH WAS PUSHED
033614  020001                          CMP     R0,R1           ;WAS THE ORIGINAL VALUE OF THE
                                                                ;STACK POINTER PUSHED?
033616  001401                          BEQ     2$              ;BRANCH IF YES
033620  104046                          ERROR   46              ;MFPI FETCHED WRONG DATA
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;''BR 1$'' = 000766
033622  005740                  2$:     TST     -(R0)           ;SETUP EXPECTED STACK POINTER VALUE
033624  020600                          CMP     KSP,R0          ;WAS THE STACK POINTER DECREMENTED?
033626  001401                          BEQ     3$              ;BRANCH IF YES
033630  104050                          ERROR   50              ;STACK NOT PUSHED BY THE MFPI
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;''BR 1$'' = 000762
033632  012706  001100          3$:     MOV     #STACK,KSP      ;RESTORE STACK POINTER
```

```
033636  013746  000004          TIMOFF: MOV     @#ERRVEC,-(SP)  ;SAVE CONTENTS OF LOC 4
033642  012737  033654  000004          MOV     #1$,@#ERRVEC    ;SETUP IN CASE OF TIMEOUT
033650  005337  164000                  DEC     @#164000        ;TURN OFF TIMER ON MULTI-TESTER
033654  012637  000004          1$:     MOV     (SP)+,@#ERRVEC  ;RESTORE CONTENTS OF LOC 4

                                .SBTTL  END OF PASS ROUTINE

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

033660                          $EOP:
033660  000004                          SCOPE
033662  005037  001102                  CLR     $TSTNM          ;;ZERO THE TEST NUMBER
033666  005037  001212                  CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
033672  005237  001234                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
033676  042737  100000  001234          BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
```

```
 4030  033704  005327                          DEC     (PC)+           ;;LOOP?
 4031  033706  000001                $EOPCT:   .WORD   1
 4032  033710  003074                          BGT     $DOAGN          ;;YES
 4033  033712  012737                          MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
 4034  033714  000001                $ENDCT:   .WORD   1
 4035  033716  033706                          $EOPCT
 4036  033720  104401  033726                  TYPE    ,65$            ;;TYPE ASCIZ STRING
 4037  033724  000407                          BR      64$             ;;GET OVER THE ASCIZ
 4038  033726  006412  047105  020104  65$:     .ASCIZ  <12><15>/END PASS #/
 4039  033734  040520  051523  021440
 4040  033742      000
 4041          033744                  .EVEN
 4042  033744                          64$:
 4043  033744  013746  001234                  MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
 4044                                                                  ;;TYPE PASS NUMBER
 4045  033750  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCIZ WITH SIGN
 4046  033752  104401  033760                  TYPE    ,67$            ;;TYPE ASCII STRING
 4047  033756  000425                          BR      66$             ;;GET OVER THE ASCIZ
 4048  033760  035411  047524  040524  67$:     .ASCIZ  /       ;TOTAL ERRORS SINCE LAST START AT 200  /
 4049  033766  020114  051105  047522
 4050  033774  051522  051440  047111
 4051  034002  042503  046040  051501
 4052  034010  020124  052123  051101
 4053  034016  020124  052101  031040
 4054  034024  030060  020040      000
 4055          034032                  .EVEN
 4056  034032                          66$:
 4057  034032  013746  001112                  MOV     $ERTTL,-(SP)    ;;SAVE $ERTTL FOR TYPEOUT
 4058                                                                  ;;TOTAL NUMBER OF ERRORS
 4059  034036  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
 4060  034040  104401  001223                  TYPE    ,$CRLF          ;;TYPE CARRIAGE RETURN, LINE FEED
 4061  034044  013700  000042        $GET42:   MOV     @#42,R0         ;;GET MONITOR ADDRESS
 4062  034050  001414                          BEQ     $DOAGN          ;;BRANCH IF NO MONITOR
 4063  034052  005046                          CLR     -(SP)           ;;INSURE THE "T" BIT IS CLEAR
 4064  034054  012746  034062                  MOV     #$CLR.T,-(SP)   ;;SETUP FOR AN RTI OR RTT
 4065  034060  000426                          BR      $RTRN           ;;GO DO AN RTI OR RTT TO LOAD THE PSW
 4066                                                                  ;;WITH A CLEARED "T" BIT
 4067  034062                          $CLR.T:
 4068  034062  013700  000042                  MOV     @#42,R0         ;;INSURE R0 CONTAINS THE MONITORS
 4069  034066  001405                          BEQ     $DOAGN          ;;RETURN ADDRESS
 4070  034070  000005                          RESET                   ;;CLEAR THE WORLD
 4071  034072  004710                $ENDAD:   JSR     PC,(R0)         ;;GO TO MONITOR
 4072  034074  000240                          NOP                     ;;SAVE ROOM
 4073  034076  000240                          NOP                     ;;FOR
 4074  034100  000240                          NOP                     ;;ACT11
 4075
 4076  034102                          $DOAGN:
 4077  034102  104400                          TRAP                    ;;PUSH OLD PSW AND PC ON STACK
 4078  034104  042716  000020                  BIC     #20,(SP)        ;;CLEAR THE "T" BIT
 4079  034110  032777  010000  145022          BIT     #BIT12,@SWR     ;;RUN WITH TRACE TRAP?
 4080  034116  001005                          BNE     1$              ;;BR IF NO
 4081  034120  005137  034144                  COM     $TBIT           ;;IS IT TIME FOR TRACE TRAP
 4082  034124  100402                          BMI     1$              ;;BR IF NO
 4083  034126  052716  000020                  BIS     #20,(SP)        ;;SET TRACE TRAP
 4084  034132  012746  034140        1$:       MOV     #$LOOP,-(SP)    ;;JUMP TO START OF TEST
 4085  034136  000002                $RTRN:    RTI                     ;;RETURN--THIS IS CHANGED TO
```

```
4086                                                    ;;AN 'RTT' IF 'RTT' IS A LEGAL
4087                                                    ;;INSTRUCTION
4088  034140                            $LOOP:
4089  034140  000137                           JMP     @(PC)+          ;;RETURN
4090  034142  020472                    $RTNAD: .WORD   RESTRT
4091  034144  000000                    $TBIT:  .WORD   0               ;;'T' BIT STATE INDICATOR
4092  034146     377      377     000    $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
4093        034152                              .EVEN
4094                                    .SBTTL  SCOPE HANDLER ROUTINE
4095
4096                                    ;;**************************************************************
4097                                    ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
4098                                    ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
4099                                    ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
4100                                    ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
4101                                    ;*SW14=1        LOOP ON TEST
4102                                    ;*SW11=1        INHIBIT ITERATIONS
4103                                    ;*SW09=1        LOOP ON ERROR
4104                                    ;*SW08=1        LOOP ON TEST IN SWR<7:0>
4105                                    ;*CALL
4106                                    ;*      SCOPE           ;;SCOPE=IOT
4107
4108  034152                            $SCOPE:
4109  034152  104410                           CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
4110  034154  032777  040000  144756    1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
4111  034162  001114                           BNE     $OVER           ;;YES IF SW14=1
4112                                    ;#####START OF CODE FOR THE XOR TESTER#####
4113  034164  000416                    $XTSTR: BR      6$              ;;IF RUNNING ON THE 'XOR' TESTER CHANGE
4114                                                                    ;;THIS INSTRUCTION TO A 'NOP' (NOP=240)
4115  034166  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
4116  034172  012737  034212  000004        MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
4117  034200  005737  177060               TST     @#177060        ;;TIME OUT ON XOR?
4118  034204  012637  000004               MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
4119  034210  000463                       BR      $SVLAD          ;;GO TO THE NEXT TEST
4120  034212  022626                    5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
4121  034214  012637  000004               MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
4122  034220  000423                       BR      7$              ;;LOOP ON THE PRESENT TEST
4123  034222                            6$:;#####END OF CODE FOR THE XOR TESTER#####
4124  034222  032777  000400  144710        BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
4125  034230  001404                       BEQ     2$              ;;BR IF NO
4126  034232  127737  144702  001102       CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
4127  034240  001465                       BEQ     $OVER           ;;BR IF YES
4128  034242  105737  001103            2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
4129  034246  001421                       BEQ     3$              ;;BR IF NO
4130  034250  123737  001115  001103       CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
4131  034256  101015                       BHI     3$              ;;BR IF NO
4132  034260  032777  001000  144652       BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
4133  034266  001404                       BEQ     4$              ;;BR IF NO
4134  034270  013737  001110  001106    7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
4135  034276  000446                       BR      $OVER
4136  034300  105037  001103            4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
4137  034304  005037  001212               CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
4138  034310  000415                       BR      1$              ;;ESCAPE TO THE NEXT TEST
4139  034312  032777  004000  144620    3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
4140  034320  001011                       BNE     1$              ;;BR IF YES
4141  034322  005737  001234               TST     $PASS           ;;IF FIRST PASS OF PROGRAM
```

```
4142  034326  001406                          BEQ     1$              ;;      INHIBIT ITERATIONS
4143  034330  005237  001104                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
4144  034334  023737  001212  001104          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
4145  034342  002024                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
4146  034344  012737  000001  001104  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
4147  034352  013737  034430  001212          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
4148  034360  105237  001102          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
4149  034364  113737  001102  001232          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
4150  034372  011637  001106                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
4151  034376  011637  001110                  MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
4152  034402  005037  001214                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
4153  034406  112737  000001  001115          MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
4154  034414  013777  001102  144520  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
4155  034422  013716  001106                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
4156  034426  000002                          RTI                     ;;FIXES PS
4157  034430  000200                  $MXCNT: 200                     ;;MAX. NUMBER OF ITERATIONS
4158                                  .SBTTL  ERROR HANDLER ROUTINE
4159
4160                                  ;;**********************************************************************
4161                                  ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
4162                                  ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
4163                                  ;*AND GO TO ERRTYP ON ERROR
4164                                  ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
4165                                  ;*SW15=1         HALT ON ERROR
4166                                  ;*SW13=1         INHIBIT ERROR TYPEOUTS
4167                                  ;*SW10=1         BELL ON ERROR
4168                                  ;*SW09=1         LOOP ON ERROR
4169                                  ;*CALL
4170                                  ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
4171
4172  034432                          $ERROR:
4173  034432  104410                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
4174  034434  010037  001162                  MOV     R0,$REG0        ;SAVE THE CONTENTS OF R0
4175  034440  010137  001164                  MOV     R1,$REG1        ;SAVE THE CONTENTS OF R1
4176  034444  010237  001166                  MOV     R2,$REG2        ;SAVE THE CONTENTS OF R2
4177  034450  010337  001170                  MOV     R3,$REG3        ;SAVE THE CONTENTS OF R3
4178  034454  010437  001172                  MOV     R4,$REG4        ;SAVE THE CONTENTS OF R4
4179  034460  010537  001174                  MOV     R5,$REG5        ;SAVE THE CONTENTS OF R5
4180  034464  113737  001102  001262          MOVB    $TSTNM,TESTNO   ;SAVE THE TEST NUMBER
4181  034472  105237  001103          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
4182  034476  001775                          BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
4183  034500  013777  001102  144434          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
4184  034506  032777  002000  144424          BIT     #BIT10,@SWR     ;;BELL ON ERROR?
4185  034514  001402                          BEQ     1$              ;;NO - SKIP
4186  034516  104401  001216                  TYPE    ,$BELL          ;;RING BELL
4187  034522  005237  001112          1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
4188  034526  011637  001116                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
4189  034532  162737  000002  001116          SUB     #2,$ERRPC
4190  034540  117737  144352  001114          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
4191  034546  032777  020000  144364          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
4192  034554  001004                          BNE     20$             ;;SKIP TYPEOUTS
4193  034556  004737  034670                  JSR     PC,ERRTYP       ;;GO TO USER ERROR ROUTINE
4194  034562  104401  001223                  TYPE    ,$CRLF
4195  034566                          20$:
4196  034566  122737  000001  001246          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
4197  034574  001007                          BNE     2$              ;;NO,SKIP APT ERROR REPORT
```

```
4198  034576  113737  001114  034610          MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
4199  034604  004737  037232                  JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
4200  034610     000                  21$:    .BYTE   0
4201  034611     000                          .BYTE   0
4202  034612  000777                  22$:    BR      22$             ;;APT ERROR LOOP
4203  034614  005777  144320          2$:     TST     @SWR            ;;HALT ON ERROR
4204  034620  100002                          BPL     3$              ;;SKIP IF CONTINUE
4205  034622  000000                          HALT                    ;;HALT ON ERROR!
4206  034624  104410                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
4207  034626  032777  001000  144304  3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
4208  034634  001402                          BEQ     4$              ;;BR IF NO
4209  034636  013716  001110                  MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
4210  034642  005737  001214          4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
4211  034646  001402                          BEQ     5$              ;;BR IF NONE
4212  034650  013716  001214                  MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
4213  034654                          5$:
4214  034654  022737  034072  000042          CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
4215  034662  001001                          BNE     6$              ;;BRANCH IF NO
4216  034664  000000                          HALT                    ;;YES
4217  034666                          6$:
4218  034666  000002                          RTI                     ;;RETURN
4219                                  .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE
4220
4221                                  ;;**************************************************************************
4222                                  ;*THIS ROUTINE USES THE ''ITEM CONTROL BYTE'' ($ITEMB) TO DETERMINE WHICH
4223                                  ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE 'ERROR TABLE'' ($ERRTB),
4224                                  ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.
4225                                  ;*
4226                                  ;*NOTES:
4227                                  ;*1)    THIS ROUTINE PROVIDES AN AUTOMATIC ''CARRIAGE RETURN-LINE FEED''
4228                                  ;*      FOR 'EM'', ''DH'', AND ''DT''.
4229                                  ;*2)    TWO SPACES ARE TYPED AFTER EACH NUMBER FOR ''DT''
4230                                  ;*3)    FOR $ITEMB=0, JUST THE ERROR PC IS TYPED
4231                                  ;*4)    THE AVAILABLE FORMATS FOR TYPING DATA ARE:
4232                                  ;*      DF      FORMAT
4233                                  ;*      0       TYPE A 6 DIGIT OCTAL NUMBER (FROM 16-BIT BINARY)
4234                                  ;*      1       TYPE A DECIMAL NUMBER WITHOUT LEADING ZEROS
4235                                  ;*      2       TYPE A 16 DIGIT BINARY NUMBER
4236                                  ;*      3       TYPE A 6 DIGIT OCTAL NUMBER (FROM 18-BIT BINARY)
4237                                  ;*
4238
4239  034670                          ERRTYP:
4240  034670  104401  001223                  TYPE    ,$CRLF          ;''CARRIAGE RETURN'' & ''LINE FEED''
4241  034674  010046                          MOV     R0,-(SP)        ;SAVE R0
4242  034676  005000                          CLR     R0              ;PICKUP THE ITEM INDEX
4243  034700  153700  001114                  BISB    @#$ITEMB,R0
4244  034704  001004                          BNE     1$              ;IF ITEM NUMBER IS ZERO, JUST
4245                                                                  ;TYPE THE PC OF THE ERROR
4246  034706  013746  001116                  MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
4247                                                                  ;;ERROR ADDRESS
4248  034712  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
4249  034714  000471                          BR      13$             ;GET OUT
4250  034716  005300                  1$:     DEC     R0              ;ADJUST THE INDEX SO THAT IT WILL
4251  034720  006300                          ASL     R0              ;       WORK FOR THE ERROR TABLE
4252  034722  006300                          ASL     R0
4253  034724  006300                          ASL     R0
```

```
4254  034726  062700  001316                ADD     #$ERRTB,R0      ;FORM TABLE POINTER
4255  034732  012037  034742                MOV     (R0)+,2$        ;PICKUP 'ERROR MESSAGE' POINTER
4256  034736  001404                        BEQ     3$              ;SKIP TYPEOUT IF NO POINTER
4257  034740  104401                        TYPE                    ;TYPE THE 'ERROR MESSAGE'
4258  034742  000000              2$:       .WORD   0               ;'ERROR MESSAGE' POINTER GOES HERE
4259  034744  104401  001223              TYPE    ,$CRLF          ;'CARRIAGE RETURN' & 'LINE FEED'
4260  034750  012037  034760        3$:   MOV     (R0)+,4$        ;PICKUP 'DATA HEADER' POINTER
4261  034754  001404                        BEQ     5$              ;SKIP TYPEOUT IF 0
4262  034756  104401                        TYPE                    ;TYPE THE 'DATA HEADER'
4263  034760  000000              4$:       .WORD   0               ;'DATA HEADER' POINTER GOES HERE
4264  034762  104401  001223              TYPE    ,$CRLF          ;'CARRIAGE RETURN' & 'LINE FEED'
4265  034766  010146              5$:       MOV     R1,-(SP)        ;SAVE R1
4266  034770  012001                        MOV     (R0)+,R1        ;PICKUP 'DATA TABLE' POINTER
4267  034772  001441                        BEQ     12$             ;BR IF NO DATA TO BE TYPED
4268  034774  012000                        MOV     (R0)+,R0        ;PICKUP 'DATA FORMAT' POINTER
4269  034776  105710              6$:       TSTB    (R0)            ;IS IT FORMAT 0?
4270  035000  001003                        BNE     7$              ;BR IF NO
4271
4272                                  ;*THIS CODE IS FOR OCTAL (16-BIT) FORMAT (DF=0)
4273  035002  013146                        MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
4274  035004  104402                        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
4275  035006  000425                        BR      11$
4276
4277                                  ;*THIS CODE IS FOR DECIMAL FORMAT (DF=1)
4278  035010  121027  000001        7$:   CMPB    (R0),#1         ;IS IT FORMAT 1?
4279  035014  001003                        BNE     8$              ;BRANCH IF NO
4280  035016  013146                        MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
4281  035020  104405                        TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
4282  035022  000417                        BR      11$
4283
4284                                  ;*THIS CODE IS FOR BINARY FORMAT (DF=2)
4285  035024  121027  000002        8$:   CMPB    (R0),#2         ;IS IT FORMAT 2?
4286  035030  001003                        BNE     9$              ;BRANCH IF NO
4287  035032  013146                        MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
4288  035034  104406                        TYPBN                   ;;GO TYPE--BINARY ASCII
4289  035036  000411                        BR      11$
4290
4291                                  ;*THIS CODE IS FOR OCTAL (18-BIT) FORMAT (DF=3)
4292  035040  012146              9$:       MOV     (R1)+,-(SP)     ;PUT ADDRESS OF FIRST LOC. ON STACK
4293  035042  004737  040304              JSR     PC,$DB2O        ;CONVERT TWO LOCS. TO AN ASCII STRING
4294  035046  062716  000005              ADD     #5,(SP)         ;ONLY NEED 6 CHARACTERS NOT 11
4295  035052  012637  035060              MOV     (SP)+,10$       ;PUT ADDRESS OF ASCII CHARS. AT 10$
4296  035056  104401                        TYPE                    ;TYPE OCTAL VALUE OF 18-BIT BINARY NO.
4297  035060  000000              10$:      .WORD   0
4298
4299  035062  005711              11$:      TST     (R1)            ;IS THERE ANOTHER NUMBER?
4300  035064  001404                        BEQ     12$             ;BR IF NO
4301  035066  104401  035110              TYPE    ,14$            ;TYPE TWO(2) SPACES
4302  035072  105720                        TSTB    (R0)+           ;POINT TO NEW 'DATA FORMAT'
4303  035074  000740                        BR      6$              ;LOOP
4304
4305  035076  012601              12$:      MOV     (SP)+,R1        ;RESTORE R1
4306  035100  012600              13$:      MOV     (SP)+,R0        ;RESTORE R0
4307  035102  104401  001223              TYPE    ,$CRLF          ;'CARRIAGE RETURN' & 'LINE FEED'
4308  035106  000207                        RTS     PC              ;RETURN
4309  035110  020040      000     14$:      .ASCIZ  /  /            ;TWO(2) SPACES
```

```
 4310            035114                          .EVEN
 4311
```

```
                                .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.
                                ;*
                                ;;******************************************************************
035114  033727  177776  000020  TOFF:   BIT     PSW,#TBIT       ;IS THE T-BIT SET IN THE PSW?
035122  001411                          BEQ     1$              ;EXIT IF NO
035124  013746  177776                  MOV     PSW,-(SP)       ;PUSH PRESENT PSW ON THE STACK
035130  011637  001276                  MOV     (SP),TBITPS     ;ALSO SAVE IT IN ''TBITPS'' FOR
                                                                ;RESTORING LATER
035134  042716  000020                  BIC     #TBIT,(SP)      ;CLEAR THE T-BIT (BIT 4) IN THE PSW
035140  012746  035146                  MOV     #1$,-(SP)       ;PUSH PC OF ''RTS'' ON STACK
035144  000006                          RTT                     ;''RETURN'' TO 1$ WITH T-BIT OFF
035146  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.
                                ;*
                                ;;******************************************************************
035150  033727  001276  000020  TON:    BIT     TBITPS,#TBIT    ;WAS T-BIT ON IN THE PREVIOUS PSW?
035156  001410                          BEQ     1$              ;EXIT IF NO
035160  013746  001276                  MOV     TBITPS,-(SP)    ;PUSH PREVIOUS PSW ON THE STACK
035164  012737  000340  001276          MOV     #340,TBITPS     ;RESET THE ''TBITPS'' LOCATION
035172  012746  035200                  MOV     #1$,-(SP)       ;PUSH PC OF ''RTS'' ON STACK
035176  000006                          RTT                     ;''RETURN'' TO 1$ WITH T-BIT RESTORED
035200  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.
                                ;*
                                ;;******************************************************************
035202  012702  000010          SETREG: MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
035206  012701  172300                  MOV     #KIPDR0,R1      ;LOAD ADDRESS OF FIRST PDR INTO R1
035212  012721  177777          1$:     MOV     #-1,(R1)+       ;SET BITS IN KERNEL PDR TO 1
035216  077203                          SOB     R2,1$           ;LOOP TO 1$ UNTIL ALL KERNEL PDR'S LOADED
035220  012702  000010                  MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
035224  012701  172340                  MOV     #KIPAR0,R1      ;LOAD ADDRESS OF FIRST PAR INTO R1
035230  012721  177777          2$:     MOV     #-1,(R1)+       ;SET BITS IN A KERNEL PAR TO 1
035234  077203                          SOB     R2,2$           ;LOOP TO 2$ UNTIL ALL KERNEL PAR'S LOADED
```

```
 4368  035236  012702  000010                MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
 4369  035242  012701  177600                MOV     #UIPDR0,R1      ;LOAD ADDRESS OF FIRST PDR INTO R1
 4370  035246  012721  177777      3$:       MOV     #-1,(R1)+       ;SET BITS IN A USER PDR TO 1
 4371  035252  077203                        SOB     R2,3$           ;LOOP TO 3$ UNTIL ALL USER PDR'S LOADED
 4372  035254  012702  000010                MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
 4373  035260  012701  177640                MOV     #UIPAR0,R1      ;LOAD ADDRESS OF FIRST PAR INTO R1
 4374  035264  012721  177777      4$:       MOV     #-1,(R1)+       ;SET BITS IN A USER PAR TO 1
 4375  035270  077203                        SOB     R2,4$           ;LOOP TO 4$ UNTIL ALL USER PAR'S LOADED
 4376  035272  000207                        RTS     PC              ;RETURN TO TEST
 4377
 4378                                  .SBTTL  READ & COMPARE KERNEL & USER PAR/PDR'S
 4379                                  ;;*****************************************************************
 4380                                  ;*
 4381                                  ;*      THIS SUBROUTINE IS USED BY PAR/PDR DUAL ADDRESSING TEST TO
 4382                                  ;*      READ ALL THE PAR'S AND PDR'S TO SEE THAT ONLY ONE REGISTER
 4383                                  ;*      WAS CLEARED IN RESPONSE TO A SINGLE PAR OR PDR ADDRESS.
 4384                                  ;*      ANY FAILURES FOUND BY THE PAR/PDR DUAL ADDRESSING TEST WILL
 4385                                  ;*      BE REPORTED BY THIS SUBROUTINE.
 4386                                  ;*
 4387                                  ;;*****************************************************************
 4388  035274                          CMPREG:
 4389  035274  012701  172300                MOV     #KIPDR0,R1      ;LOAD ADDRESS OF FIRST KERNEL PDR IN R1
 4390  035300  012704  000010                MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
 4391  035304  012705  077416                MOV     #77416,R5       ;PUT EXPECTED PDR CONTENTS IN R5
 4392  035310  021105              1$:       CMP     (R1),R5         ;ARE ALL WRITEABLE BITS SET AS EXPECTED?
 4393  035312  001404                        BEQ     2$              ;BRANCH IF YES
 4394  035314  020100                        CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
 4395  035316  001402                        BEQ     2$              ;BRANCH IF YES
 4396  035320  011102                        MOV     (R1),R2         ;SAVE CONTENTS OF IMPROPERLY CLEARED REGISTER
 4397  035322  104016                        ERROR   16              ;A PDR WAS EFFECTED BY CLEARING A DIFFERENT PAR/PDR
 4398                                                                ;FOR TIGHTER SCOPE LOOP
 4399                                                                ;REPLACE ERROR CALL WITH
 4400                                                                ;AN 'RTS PC'' = 000207
 4401  035324  062701  000002      2$:       ADD     #2,R1           ;FORM NEXT ADDRESS
 4402  035330  077411                        SOB     R4,1$           ;LOOP TO 1$ UNTIL ALL KERNEL PDR'S CHECKED
 4403  035332  012701  172340                MOV     #KIPAR0,R1      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R1
 4404  035336  012704  000010                MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
 4405  035342  012705  177777                MOV     #177777,R5      ;PUT EXPECTED PAR CONTENTS IN R5
 4406  035346  021105              3$:       CMP     (R1),R5         ;ARE ALL WRITEABLE BITS SET AS EXPECTED?
 4407  035350  001404                        BEQ     4$              ;BRANCH IF YES
 4408  035352  020100                        CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
 4409  035354  001402                        BEQ     4$              ;BRANCH IF YES
 4410  035356  011102                        MOV     (R1),R2         ;SAVE CONTENTS OF IMPROPERLY CLEARED REGISTER
 4411  035360  104016                        ERROR   16              ;A PAR WAS EFFECTED BY CLEARING A DIFFENENT PAR/PDR
 4412                                                                ;FOR TIGHTER SCOPE LOOP
 4413                                                                ;REPLACE ERROR CALL WITH
 4414                                                                ;AN 'RTS PC'' = 000207
 4415  035362  062701  000002      4$:       ADD     #2,R1           ;FORM NEXT ADDRESS
 4416  035366  077411                        SOB     R4,3$           ;LOOP TO 3$ UNTIL ALL KERNEL PAR'S CHECKED
 4417  035370  012701  177600                MOV     #UIPDR0,R1      ;LOAD ADDRESS OF FIRST USER PDR IN R1
 4418  035374  012704  000010                MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
 4419  035400  012705  077416                MOV     #77416,R5       ;PUT EXPECTED PDR CONTENTS IN R5
 4420  035404  021105              5$:       CMP     (R1),R5         ;ARE ALL WRITEABLE BITS SET AS EXPECTED?
 4421  035406  001404                        BEQ     6$              ;BRANCH IF YES
 4422  035410  020100                        CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
 4423  035412  001402                        BEQ     6$              ;BRANCH IF YES
```

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4424  035414  011102                  MOV     (R1),R2         ;SAVE CONTENTS OF IMPROPERLY CLEARED REGISTER
4425  035416  104016                  ERROR   16              ;A PDR WAS EFFECTED BY CLEARING A DIFFERENT PAR/PDR
4426                                                          ;FOR TIGHTER SCOPE LOOP
4427                                                          ;REPLACE ERROR CALL WITH
4428                                                          ;AN 'RTS PC'' = 000207
4429  035420  062701  000002      6$:     ADD     #2,R1           ;FORM NEXT ADDRESS
4430  035424  077411                      SOB     R4,5$           ;LOOP TO 5$ UNTIL ALL USER PDR'S CHECKED
4431  035426  012701  177640              MOV     #UIPAR0,R1      ;LOAD ADDRESS OF FIRST USER PAR IN R1
4432  035432  012704  000010              MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
4433  035436  012705  177777              MOV     #177777,R5      ;PUT EXPECTED PAR CONTENTS IN R5
4434  035442  021105              7$:     CMP     (R1),R5         ;ARE ALL WRITEABLE BITS SET AS EXPECTED?
4435  035444  001404                      BEQ     8$              ;BRANCH IF YES
4436  035446  020100                      CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
4437  035450  001402                      BEQ     8$              ;BRANCH IF YES
4438  035452  011102                      MOV     (R1),R2         ;SAVE CONTENTS OF IMPROPERLY CLEARED REGISTER
4439  035454  104016                      ERROR   16              ;A PAR WAS EFFECTED BY CLEARING A DIFFERENT PAR/PDR
4440                                                          ;FOR TIGHTER SCOPE LOOP
4441                                                          ;REPLACE ERROR CALL WITH
4442                                                          ;AN 'RTS PC'' = 000207
4443  035456  062701  000002      8$:     ADD     #2,R1           ;FORM NEXT ADDRESS
4444  035462  077411                      SOB     R4,7$           ;LOOP TO 7$ UNTIL ALL USER PAR'S CHECKED
4445  035464  000207                      RTS     PC              ;RETURN TO TEST
4446
4447                                  .SBTTL  CONVERT VIRTUAL ADDRESS TO PHYSICAL ADDRESS
4448                                  ;;**********************************************************************
4449                                  ;*
4450                                  ;*      THIS SUBROUTINE IS USED TO FORM AN 18-BIT PHYSICAL ADDRESS
4451                                  ;*      (PBA) FROM THE 16-BIT VIRTUAL ADDRESS (VBA) AND THE APPROPRIATE
4452                                  ;*      PAGE ADDRESS REGISTER (PAR).  THE SAME METHOD USED BY THE MEMORY
4453                                  ;*      MANAGEMENT LOGIC IS USED.  VBA <15:13> SELECTS WHICH PAR/PDR
4454                                  ;*      IS TO BE USED, VBA <5:0>+PBA <5:0>, AND VBA <12:6> IS ADDED
4455                                  ;*      TO PAR <11:00> TO GIVE PBA <17:6>.  BITS <17:16> OF THE
4456                                  ;*      PHYSICAL ADDRESS ARE LEFT IN LOC. ''PBAHI'' AND BITS <15:00>
4457                                  ;*      ARE LEFT IN LOC. ''PBALO''.  THE PSW'S ''CURRENT MODE'' BITS
4458                                  ;*      ARE USED TO SELECT THE KERNEL OR USER PAR/PDR'S.  THE ROUTINE
4459                                  ;*      IS ENTERED WITH LOC. 'VIRT1'' CONTAINING THE 16-BIT VIRTUAL
4460                                  ;*      ADDRESS.
4461                                  ;*
4462                                  ;;**********************************************************************
4463
4464  035466                      FORMPA:
4465  035466  010046                      MOV     R0,-(SP)        ;;PUSH R0 ON STACK
4466  035470  010246                      MOV     R2,-(SP)        ;;PUSH R2 ON STACK
4467  035472  012702  172340              MOV     #KIPAR0,R2      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R2
4468  035476  032737  140000  177776      BIT     #140000,PSW     ;IN USER MODE?
4469  035504  001402                      BEQ     1$              ;BRANCH IF NO
4470  035506  012702  177640              MOV     #UIPAR0,R2      ;LOAD ADDRESS OF FIRST USER PAR IN R2
4471  035512  013700  001306      1$:     MOV     VIRT1,R0        ;LOAD VIRTUAL ADDR. (VBA) INTO R0
4472  035516  072027  177764              ASH     #-14,R0         ;GET BITS <15:13> DOWN TO BITS <3:1>
4473  035522  042700  177761              BIC     #177761,R0      ;MASK OF ALL BITS BUT BITS <3:1>
4474  035526  060002                      ADD     R0,R2           ;ADD OFFSET TO BASE PAR ADDRESS
4475  035530  011200                      MOV     (R2),R0         ;GET BITS <11:00> FROM APPROPRIATE PAR
4476  035532  010002                      MOV     R0,R2           ;COPY PAR BITS <11:00> INTO R2
4477  035534  013737  001306  001312      MOV     VIRT1,PBALO     ;PUT VIRTUAL ADDR. IN LOC. ''PBALO''
4478  035542  042737  160000  001312      BIC     #160000,PBALO   ;CLEAR OFF BITS <15:13> OF ORIGINAL VBA
4479  035550  072227  177766              ASH     #-12,R2         ;GET PAR <11:00> DOWN TO BITS <1:0> OF R2
```

```
 4480  035554  042702  177774                BIC     #177774,R2      ;CLEAR OFF ALL BITS BUT BITS <1:0>
 4481  035560  072027  000006                ASH     #6,R0           ;SHIFT PAR<9:0> TO <15:6> OF R0
 4482  035564  042700  000077                BIC     #77,R0          ;CLEAR BITS <5:0> OF R0
 4483  035570  060037  001312                ADD     R0,PBALO        ;IN EFFECT, ADD VBA<12:0> TO PAR<9:0>
 4484                                                                ;(PAR<9:0> IN BITS <15:6> OF R0)
 4485  035574  005502                        ADC     R2              ;ADD ANY CARRY TO R2
 4486  035576  010237  001314                MOV     R2,PBAHI        ;PUT BITS <17:16> OF PHYSICAL ADDR. IN PBAHI
 4487  035602  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
 4488  035604  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
 4489  035606  000207                        RTS     PC              ;RETURN TO PROGRAM
 4490
 4491
```

```
4492                                    .SBTTL  TTY INPUT ROUTINE
4493
4494                                    ;;**********************************************************************
4495                                    .ENABL  LSB
4496
4497                                    ;;**********************************************************************
4498                                    ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
4499                                    ;*ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL
4500                                    ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL
4501                                    ;*WHEN OPERATING IN TTY FLAG MODE.
4502  035610  022737  000176  001140  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED?
4503  035616  001114                          BNE     15$             ;;BRANCH IF NO
4504  035620  105777  143320                  TSTB    @$TKS           ;;CHAR THERE?
4505  035624  100111                          BPL     15$             ;;IF NO, DON'T WAIT AROUND
4506  035626  117746  143314                  MOVB    @$TKB,-(SP)     ;;SAVE THE CHAR
4507  035632  042716  177600                  BIC     #^C177,(SP)     ;;STRIP-OFF THE ASCII
4508  035636  022726  000007                  CMP     #7,(SP)+        ;;IS IT A CONTROL G?
4509  035642  001102                          BNE     15$             ;;NO, RETURN TO USER
4510  035644  123727  001134  000001          CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
4511  035652  001476                          BEQ     15$             ;;BRANCH IF YES
4512
4513  035654  104401  036552                  TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
4514  035660  104401  036557  $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
4515  035664  013746  000176                  MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
4516  035670  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
4517  035672  104401  036570                  TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
4518  035676  005046                  19$:    CLR     -(SP)           ;;CLEAR COUNTER
4519  035700  005046                          CLR     -(SP)           ;;THE NEW SWR
4520  035702  105777  143236          7$:     TSTB    @$TKS           ;;CHAR THERE?
4521  035706  100375                          BPL     7$              ;;IF NOT TRY AGAIN
4522
4523  035710  117746  143232                  MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
4524  035714  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
4525
4526  035720  021627  000003                  CMP     (SP),#3         ;;IS IT A CONTROL-C?
4527  035724  001015                          BNE     9$              ;;BRANCH IF NOT
4528  035726  104401  036540                  TYPE    ,$CNTLC         ;;YES, ECHO CONTROL-C (^C)
4529  035732  062706  000006                  ADD     #6,SP           ;;CLEAN UP STACK
4530  035736  123727  001135  000001          CMPB    $INTAG,#1       ;;REENABLE TTY KEYBOARD INTERRUPTS?
4531  035744  001003                          BNE     8$              ;;BRANCH IF NO
4532  035746  012777  000100  143170          MOV     #100,@$TKS      ;;ALLOW TTY KEYBOARD INTERRUPTS
4533  035754  000137  036602          8$:     JMP     CNTRLC          ;;CONTROL-C RESTART
4534
4535
4536  035760  021627  000025          9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
4537  035764  001005                          BNE     10$             ;;BRANCH IF NOT
4538  035766  104401  036545                  TYPE    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
4539  035772  062706  000006          20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
4540  035776  000737                          BR      19$             ;;LET'S TRY IT AGAIN
4541
4542
4543  036000  021627  000015          10$:    CMP     (SP),#15        ;;IS IT A <CR>?
4544  036004  001022                          BNE     16$             ;;BRANCH IF NO
4545  036006  005766  000004                  TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
4546  036012  001403                          BEQ     11$             ;;BRANCH IF YES
4547  036014  016677  000002  143116          MOV     2(SP),@SWR      ;;SAVE NEW SWR
```

```
4548  036022  062706  000006          11$:    ADD     #6,SP           ;;CLEAR UP STACK
4549  036026  104401  001223          14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
4550  036032  123727  001135  000001          CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
4551  036040  001003                          BNE     15$             ;;BRANCH IF NOT
4552  036042  012777  000100  143074          MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
4553  036050  000002                  15$:    RTI                     ;;RETURN
4554  036052  004737  037144          16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
4555  036056  021627  000060                  CMP     (SP),#60        ;;CHAR < 0?
4556  036062  002420                          BLT     18$             ;;BRANCH IF YES
4557  036064  021627  000067                  CMP     (SP),#67        ;;CHAR > 7?
4558  036070  003015                          BGT     18$             ;;BRANCH IF YES
4559  036072  042726  000060                  BIC     #60,(SP)+       ;;STRIP-OFF ASCII
4560  036076  005766  000002                  TST     2(SP)           ;;IS THIS THE FIRST CHAR
4561  036102  001403                          BEQ     17$             ;;BRANCH IF YES
4562  036104  006316                          ASL     (SP)            ;;NO, SHIFT PRESENT
4563  036106  006316                          ASL     (SP)            ;;   CHAR OVER TO MAKE
4564  036110  006316                          ASL     (SP)            ;;   ROOM FOR NEW ONE.
4565  036112  005266  000002          17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
4566  036116  056616  177776                  BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
4567  036122  000667                          BR      7$              ;;GET THE NEXT ONE
4568  036124  104401  001222          18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
4569  036130  000720                          BR      20$             ;;SIMULATE CONTROL-U
4570                                  .DSABL  LSB
4571
4572
4573                                  ;;**********************************************************************
4574                                  ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
4575                                  ;*CALL:
4576                                  ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
4577                                  ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
4578                                  ;*                              ;;WITH PARITY BIT STRIPPED OFF
4579                                  ;
4580
4581  036132  011646          $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
4582  036134  016666  000004  000002          MOV     4(SP),2(SP)     ;;SAVE THE PS
4583  036142  105777  142776          1$:     TSTB    @$TKS           ;;WAIT FOR
4584  036146  100375                          BPL     1$              ;;A CHARACTER
4585  036150  117766  142772  000004          MOVB    @$TKB,4(SP)     ;;READ THE TTY
4586  036156  042766  177600  000004          BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
4587  036164  026627  000004  000023          CMP     4(SP),#23       ;;IS IT A CONTROL-S?
4588  036172  001013                          BNE     3$              ;;BRANCH IF NO
4589  036174  105777  142744          2$:     TSTB    @$TKS           ;;WAIT FOR A CHARACTER
4590  036200  100375                          BPL     2$              ;;LOOP UNTIL ITS THERE
4591  036202  117746  142740                  MOVB    @$TKB,-(SP)     ;;GET CHARACTER
4592  036206  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
4593  036212  022627  000021                  CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
4594  036216  001366                          BNE     2$              ;;IF NOT DISCARD IT
4595  036220  000750                          BR      1$              ;;YES, RESUME
4596  036222  026627  000004  000140  3$:     CMP     4(SP),#140      ;;IS IT UPPER CASE?
4597  036230  002407                          BLT     4$              ;;BRANCH IF YES
4598  036232  026627  000004  000175          CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
4599  036240  003003                          BGT     4$              ;;BRANCH IF YES
4600  036242  042766  000040  000004          BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
4601  036250  000002                  4$:     RTI                     ;;GO BACK TO USER
4602                                  ;;**********************************************************************
4603                                  ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
```

```
4604                                    ;*CALL:
4605                                    ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
4606                                    ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
4607                                    ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
4608
4609  036252  010346                    $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
4610  036254  005046                            CLR     -(SP)           ;;CLEAR THE RUBOUT KEY
4611  036256  012703  036530            1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
4612  036262  022703  036540            2$:     CMP     #$TTYIN+8.,R3   ;;BUFFER FULL?
4613  036266  101467                            BLOS    4$              ;;BR IF YES
4614  036270  104411                            RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
4615  036272  112613                            MOVB    (SP)+,(R3)      ;;GET CHARACTER
4616  036274  122713  000003                    CMPB    #3,(R3)         ;;IS IT A CONTROL-C?
4617  036300  001006                            BNE     10$             ;;BRANCH IF NO
4618  036302  104401  036540                    TYPE    ,$CNTLC         ;;TYPE A CONTROL-C (^C)
4619  036306  005726                            TST     (SP)+           ;;CLEAN RUBOUT KEY OFF OF THE STACK
4620  036310  012603                            MOV     (SP)+,R3        ;;RESTORE R3
4621  036312  000137  036602                    JMP     CNTRLC          ;;GOTO CONTROL-C RESTART
4622  036316  122713  000177            10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
4623  036322  001022                            BNE     5$              ;;BR IF NO
4624  036324  005716                            TST     (SP)            ;;IS THIS THE FIRST RUBOUT?
4625  036326  001007                            BNE     6$              ;;BR IF NO
4626  036330  112737  000134  036526          MOVB    #'\,9$          ;;TYPE A BACK SLASH
4627  036336  104401  036526                    TYPE    ,9$
4628  036342  012716  177777                    MOV     #-1,(SP)        ;;SET THE RUBOUT KEY
4629  036346  005303                    6$:     DEC     R3              ;;BACKUP BY ONE
4630  036350  020327  036530                    CMP     R3,#$TTYIN      ;;STACK EMPTY?
4631  036354  103434                            BLO     4$              ;;BR IF YES
4632  036356  111337  036526                    MOVB    (R3),9$         ;;SETUP TO TYPEOUT THE DELETED CHAR.
4633  036362  104401  036526                    TYPE    ,9$             ;;GO TYPE
4634  036366  000735                            BR      2$              ;;GO READ ANOTHER CHAR.
4635  036370  005716                    5$:     TST     (SP)            ;;RUBOUT KEY SET?
4636  036372  001406                            BEQ     7$              ;;BR IF NO
4637  036374  112737  000134  036526          MOVB    #'\,9$          ;;TYPE A BACK SLASH
4638  036402  104401  036526                    TYPE    ,9$
4639  036406  005016                            CLR     (SP)            ;;CLEAR THE RUBOUT KEY
4640  036410  122713  000025            7$:     CMPB    #25,(R3)        ;;IS CHARACTER A CTRL U?
4641  036414  001003                            BNE     8$              ;;BR IF NO
4642  036416  104401  036545                    TYPE    ,$CNTLU         ;;TYPE A CONTROL 'U''
4643  036422  000715                            BR      1$              ;;GO START OVER
4644  036424  122713  000022            8$:     CMPB    #22,(R3)        ;;IS CHARACTER A ''^R''?
4645  036430  001011                            BNE     3$              ;;BRANCH IF NO
4646  036432  105013                            CLRB    (R3)            ;;CLEAR THE CHARACTER
4647  036434  104401  001223                    TYPE    ,$CRLF          ;;TYPE A ''CR'' & ''LF''
4648  036440  104401  036530                    TYPE    ,$TTYIN         ;;TYPE THE INPUT STRING
4649  036444  000706                            BR      2$              ;;GO PICKUP ANOTHER CHACTER
4650  036446  104401  001222            4$:     TYPE    ,$QUES          ;;TYPE A '?'
4651  036452  000701                            BR      1$              ;;CLEAR THE BUFFER AND LOOP
4652  036454  111337  036526            3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
4653  036460  104401  036526                    TYPE    ,9$
4654  036464  122723  000015                    CMPB    #15,(R3)+       ;;CHECK FOR RETURN
4655  036470  001274                            BNE     2$              ;;LOOP IF NOT RETURN
4656  036472  105063  177777                    CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
4657  036476  104401  001224                    TYPE    ,$LF            ;;TYPE A LINE FEED
4658  036502  005726                            TST     (SP)+           ;;CLEAN RUBOUT KEY FROM THE STACK
4659  036504  012603                            MOV     (SP)+,R3        ;;RESTORE R3
```

```
4660  036506  011646                        MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
4661  036510  016666  000004  000002        MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
4662  036516  012766  036530  000004        MOV     #$TTYIN,4(SP)
4663  036524  000002                        RTI                     ;;RETURN
4664  036526     000                9$:     .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
4665  036527     000                        .BYTE   0               ;;TERMINATOR
4666  036530  000010             $TTYIN: .BLKB   8.              ;;RESERVE 8 BYTES FOR TTY INPUT
4667  036540  041536  005015       000  $CNTLC: .ASCIZ  /^C/<15><12>    ;;CONTROL 'C'
4668  036545     136  006525  000012  $CNTLU: .ASCIZ  /^U/<15><12>    ;;CONTROL 'U'
4669  036552  043536  005015       000  $CNTLG: .ASCIZ  /^G/<15><12>    ;;CONTROL 'G'
4670  036557     015  051412  051127  $MSWR:  .ASCIZ  <15><12>/SWR = /
4671  036564  036440  000040
4672  036570  020040  042516  020127  $MNEW:  .ASCIZ  /  NEW = /
4673  036576  020075     000
4674          036602                .EVEN
4675
4676                                .SBTTL  CONTROL-C SERVICING ROUTINE
4677
4678                                ;*      THE FOLLOWING CODE IS EXECUTED WHEN A CONTROL-C HAS
4679                                ;*      BEEN TYPED INSTEAD OF A NEW SWITCH REG. VALUE.
```

```
4680                                    ;*      (IN OTHER WORDS, AFTER A CONTROL-G WAS TYPED).
4681                                    ;*      A NEW SWITCH REG. VALUE WILL BE ASKED FOR,
4682                                    ;*      THE TEST NUMBER AND PASS NUMBER WILL BE TYPED,
4683                                    ;*      AND THEN THE PROGRAM WILL GO TO 'END-OF-PASS'' AND CONTINUE
4684
4685  036602  013737  001234  001210  CNTRLC: MOV     $PASS,$TMP5     ;GET THE VALUE OF '$PASS''
4686  036610  005237  001210                  INC     $TMP5           ;FORM CURRENT PASS NO.
4687  036614  104401  036661                  TYPE    ,CMSG           ;TYPE THE TEST STOPS MESSAGE
4688  036620  113737  001102  036654          MOVB    $TSTNM,1$       ;SAVE THE TEST NUMBER
4689  036626  013746  036654                  MOV     1$,-(SP)        ;;SAVE 1$ FOR TYPEOUT
4690  036632  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
4691  036634  104401  036656                  TYPE    ,2$             ;TYPE 2 SPACES
4692  036640  013746  001210                  MOV     $TMP5,-(SP)     ;;SAVE $TMP5 FOR TYPEOUT
4693  036644  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
4694  036646  104407                          GTSWR                   ;ASK FOR NEW SWR VALUE
4695  036650  000137  033662                  JMP     $EOP+2          ;CONTINUE AT $EOP+2
4696  036654  000000                  1$:     .WORD   0               ;BUFFER FOR TEST NUMBER
4697  036656  020040      000       2$:     .ASCIZ  /  /            ;TWO SPACES AND THE STOP MESSAGE
4698  036661      112   046525  044520  CMSG:   .ASCII  /JUMPING TO END-OF-PASS/<15><12>
4699  036666  043516  052040  020117
4700  036674  047105  026504  043117
4701  036702  050055  051501  006523
4702  036710      012
4703  036711      124   051505  047124          .ASCIZ  /TESTNO  PASSNO/<15><12>
4704  036716  020117  050040  051501
4705  036724  047123  006517  000012
4706                                            .EVEN
4707                                    .SBTTL  TYPE ROUTINE
4708
4709                                    ;;******************************************************************
4710                                    ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
4711                                    ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
4712                                    ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
4713                                    ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
4714                                    ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
4715                                    ;*
4716                                    ;*CALL:
4717                                    ;*1) USING A TRAP INSTRUCTION
4718                                    ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
4719                                    ;*OR
4720                                    ;*      TYPE
4721                                    ;*      MESADR
4722                                    ;*
4723
4724  036732  105737  001157          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
4725  036736  100002                          BPL     1$              ;;BR IF YES
4726  036740  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
4727  036742  000430                          BR      3$              ;;LEAVE
4728  036744  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
4729  036746  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
4730  036752  122737  000001  001246          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
4731  036760  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
4732  036762  132737  000100  001247          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
4733  036770  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
4734  036772  010037  037002                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
4735  036776  004737  037222                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
```

```
4736  037002  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
4737  037004  132737  000040  001247  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
4738  037012  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
4739  037014  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
4740  037016  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
4741  037020  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
4742  037022  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
4743  037024  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
4744  037030  000002                          RTI                     ;;RETURN
4745  037032  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
4746  037036  001430                          BEQ     8$
4747  037040  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
4748  037044  001006                          BNE     5$
4749  037046  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
4750  037050  104401                          TYPE                    ;;TYPE A CR AND LF
4751  037052  001223                          $CRLF
4752  037054  105037  037210                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
4753  037060  000755                          BR      2$              ;;GET NEXT CHARACTER
4754  037062  004737  037144          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
4755  037066  123726  001156          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
4756  037072  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
4757  037074  013746  001154                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
4758                                                                  ;;AND THE NULL CHAR.
4759  037100  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
4760  037104  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
4761  037106  004737  037144                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
4762  037112  105337  037210                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
4763  037116  000770                          BR      7$              ;;LOOP
4764
4765                                  ;HORIZONTAL TAB PROCESSOR
4766
4767  037120  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
4768  037124  004737  037144          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
4769  037130  132737  000007  037210          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
4770  037136  001372                          BNE     9$              ;;TAB STOP
4771  037140  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
4772  037142  000724                          BR      2$              ;;GET NEXT CHARACTER
4773  037144  105777  142000          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
4774  037150  100375                          BPL     $TYPEC
4775  037152  116677  000002  141772          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
4776  037160  122766  000015  000002          CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
4777  037166  001003                          BNE     1$              ;;BRANCH IF NO
4778  037170  105037  037210                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
4779  037174  000406                          BR      $TYPEX          ;;EXIT
4780  037176  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
4781  037204  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
4782  037206  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
4783  037210  000000          $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
4784  037212  000207          $TYPEX: RTS     PC
4785
4786                                  .SBTTL  APT COMMUNICATIONS ROUTINE
4787
4788                                  ;;**************************************************************************
4789  037214  112737  000001  037460  $ATY1:   MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
4790  037222  112737  000001  037456  $ATY3:   MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
4791  037230  000403                          BR      $ATYC
```

```
4792  037232  112737  000001  037460  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
4793  037240                          $ATYC:
4794  037240  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
4795  037242  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
4796  037244  105737  037456                  TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
4797  037250  001450                          BEQ     5$              ;;IF NOT:  BR
4798  037252  122737  000001  001246          CMPB    #AFTENV,$ENV    ;;OPERATING UNDER APT?
4799  037260  001031                          BNE     3$              ;;IF NOT:  BR
4800  037262  132737  000100  001247          BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
4801  037270  001425                          BEQ     3$              ;;IF NOT:  BR
4802  037272  017600  000004                  MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
4803  037276  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
4804  037304  005737  001226          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
4805  037310  001375                          BNE     1$              ;;IF NOT:  WAIT
4806  037312  010037  001242                  MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
4807  037316  105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
4808  037320  001376                          BNE     2$
4809  037322  163700  001242                  SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
4810  037326  006200                          ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
4811  037330  010037  001244                  MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
4812  037334  012737  000004  001226          MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
4813  037342  000413                          BR      5$
4814  037344  017637  000004  037370  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
4815  037352  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
4816  037360  013746  177776                  MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
4817  037364  004737  036732                  JSR     PC,$TYPE        ;;CALL TYPE MACRO
4818  037370  000000                  4$:     .WORD   0
4819  037372                          5$:
4820  037372  105737  037460          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
4821  037376  001416                          BEQ     12$             ;;IF NOT:  BR
4822  037400  005737  001246                  TST     $ENV            ;;RUNNING UNDER APT?
4823  037404  001413                          BEQ     12$             ;;IF NOT:  BR
4824  037406  005737  001226          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
4825  037412  001375                          BNE     11$             ;;IF NOT:  WAIT
4826  037414  017637  000004  001230          MOV     @4(SP),$FATAL   ;;GET ERROR #
4827  037422  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
4828  037430  005237  001226                  INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
4829  037434  105037  037460          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
4830  037440  105037  037457                  CLRB    $LFLG           ;;CLEAR LOG FLAG
4831  037444  105037  037456                  CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
4832  037450  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
4833  037452  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
4834  037454  000207                          RTS     PC              ;;RETURN
4835  037456     000  $MFLG:   .BYTE   0      ;;MESSG. FLAG
4836  037457     000  $LFLG:   .BYTE   0      ;;LOG FLAG
4837  037460     000  $FFLG:   .BYTE   0      ;;FATAL FLAG
4838          037462          .EVEN
4839          000200  AFTSIZE=200
4840          000001  APTENV=001
4841          000100  APTSPOOL=100
4842          000040  APTCSUP=040
4843                  .SBTTL  BINARY TO ASCII AND TYPE ROUTINE
4844
4845                  ;;******************************************************************
4846                  ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 16-BIT
4847                  ;*BINARY-ASCII NUMBER AND TYPE IT.
```

```
                                        ;*CALL:
                                        ;*      MOV     NUMBER,-(SP)    ;;NUMBER TO BE TYPED
                                        ;*      TYPBN                   ;;TYPE IT
                                        $TYPBN: MOV     R1,-(SP)        ;;SAVE R1 ON THE STACK
037462  010146                                 MOV     6(SP),R1        ;;GET THE INPUT NUMBER
037464  016601  000006                         SEC                     ;;SET "C" SO CAN KEEP TRACK OF THE NUMBER OF BITS
037470  000261                         1$:     MOVB    #'0,$BIN        ;;SET CHARACTER TO AN ASCII "0".
037472  112737  000060  037534                 ROL     R1              ;;GET THIS BIT
037500  006101                                 BEQ     2$              ;;DONE?
037502  001406                                 ADCB    $BIN            ;;NO--SET THE CHARACTER EQUAL TO THIS BIT
037504  105537  037534                         TYPE    ,$BIN           ;;GO TYPE THIS BIT
037510  104401  037534                         CLC                     ;;CLEAR "C" SO CAN KEEP TRACK OF BITS
037514  000241                                 BR      1$              ;;GO DO THE NEXT BIT
037516  000765                         2$:     MOV     (SP)+,R1        ;;POP THE STACK INTO R1
037520  012601                                 MOV     2(SP),4(SP)     ;;ADJUST THE STACK
037522  016666  000002  000004                 MOV     (SP)+,(SP)
037530  012616                                 RTI                     ;;RETURN TO USER
037532  000002                         $BIN:   .BYTE   0,0             ;;STORAGE FOR ASCII CHAR. AND TERMINATOR
037534     000     000                 .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE

                                        ;;**************************************************************
                                        ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
                                        ;*OCTAL (ASCII) NUMBER AND TYPE IT.
                                        ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                        ;*      TYPOS                   ;;CALL FOR TYPEOUT
                                        ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
                                        ;*      .BYTE   M               ;;M=1 OR 0
                                        ;*                                      ;;1=TYPE LEADING ZEROS
                                        ;*                                      ;;0=SUPPRESS LEADING ZEROS
                                        ;*
                                        ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
                                        ;*$TYPOS OR $TYPOC
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                        ;*      TYPON                   ;;CALL FOR TYPEOUT
                                        ;*
                                        ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                        ;*      TYPOC                   ;;CALL FOR TYPEOUT

037536  017646  000000                 $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
037542  116637  000001  037761                 MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
037550  112637  037763                         MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
037554  062716  000002                         ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
037560  000406                                 BR      $TYPON
037562  112737  000001  037761         $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
037570  112737  000006  037763                 MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
037576  112737  000005  037760         $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
037604  010346                                 MOV     R3,-(SP)        ;;SAVE R3
037606  010446                                 MOV     R4,-(SP)        ;;SAVE R4
037610  010546                                 MOV     R5,-(SP)        ;;SAVE R5
037612  113704  037763                         MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
```

```
4904  037616  005404                        NEG     R4
4905  037620  062704  000006                ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
4906  037624  110437  037762                MOVB    R4,$OMODE       ;;SAVE IT FOR USE
4907  037630  113704  037761                MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
4908  037634  016605  000012                MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
4909  037640  005003                        CLR     R3              ;;CLEAR THE OUTPUT WORD
4910  037642  006105                1$:     ROL     R5              ;;ROTATE MSB INTO "C"
4911  037644  000404                        BR      3$              ;;GO DO MSB
4912  037646  006105                2$:     ROL     R5              ;;FORM THIS DIGIT
4913  037650  006105                        ROL     R5
4914  037652  006105                        ROL     R5
4915  037654  010503                        MOV     R5,R3
4916  037656  006103                3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
4917  037660  105337  037762                DECB    $OMODE          ;;TYPE THIS DIGIT?
4918  037664  100016                        BPL     7$              ;;BR IF NO
4919  037666  042703  177770                BIC     #177770,R3      ;;GET RID OF JUNK
4920  037672  001002                        BNE     4$              ;;TEST FOR 0
4921  037674  005704                        TST     R4              ;;SUPPRESS THIS 0?
4922  037676  001403                        BEQ     5$              ;;BR IF YES
4923  037700  005204                4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
4924  037702  052703  000060                BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
4925  037706  052703  000040        5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
4926  037712  110337  037756                MOVB    R3,8$           ;;SAVE FOR TYPING
4927  037716  104401  037756                TYPE    ,8$             ;;GO TYPE THIS DIGIT
4928  037722  105337  037760        7$:     DECB    $OCNT           ;;COUNT BY 1
4929  037726  003347                        BGT     2$              ;;BR IF MORE TO DO
4930  037730  002402                        BLT     6$              ;;BR IF DONE
4931  037732  005204                        INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
4932  037734  000744                        BR      2$              ;;GO DO THE LAST DIGIT
4933  037736  012605                6$:     MOV     (SP)+,R5        ;;RESTORE R5
4934  037740  012604                        MOV     (SP)+,R4        ;;RESTORE R4
4935  037742  012603                        MOV     (SP)+,R3        ;;RESTORE R3
4936  037744  016666  000002  000004        MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
4937  037752  012616                        MOV     (SP)+,(SP)
4938  037754  000002                        RTI                     ;;RETURN
4939  037756     000                8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
4940  037757     000                        .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
4941  037760     000                $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
4942  037761     000                $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
4943  037762  000000                $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
4944                                .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
4945
4946                                ;;**********************************************************************
4947                                ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
4948                                ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
4949                                ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
4950                                ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
4951                                ;*REPLACED WITH SPACES.
4952                                ;*CALL:
4953                                ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
4954                                ;*      TYPDS                   ;;GO TO THE ROUTINE
4955
4956  037764                        $TYPDS:
4957  037764  010046                        MOV     R0,-(SP)        ;;PUSH R0 ON STACK
4958  037766  010146                        MOV     R1,-(SP)        ;;PUSH R1 ON STACK
4959  037770  010246                        MOV     R2,-(SP)        ;;PUSH R2 ON STACK
```

```
 4960  037772  010346                        MOV     R3,-(SP)        ;;PUSH R3 ON STACK
 4961  037774  010546                        MOV     R5,-(SP)        ;;PUSH R5 ON STACK
 4962  037776  012746  020200                MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
 4963  040002  016605  000020                MOV     20(SP),R5       ;;GET THE INPUT NUMBER
 4964  040006  100004                        BPL     1$              ;;BR IF INPUT IS POS.
 4965  040010  005405                        NEG     R5              ;;MAKE THE BINARY NUMBER POS.
 4966  040012  112766  000055  000001        MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
 4967  040020  005000                1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
 4968  040022  012703  040200                MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
 4969  040026  112723  000040                MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
 4970  040032  005002                2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
 4971  040034  016001  040170                MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
 4972  040040  160105                3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
 4973  040042  002402                        BLT     4$              ;;BR IF DONE
 4974  040044  005202                        INC     R2              ;;INCREASE THE BCD DIGIT BY 1
 4975  040046  000774                        BR      3$
 4976  040050  060105                4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
 4977  040052  005702                        TST     R2              ;;CHECK IF BCD DIGIT=0
 4978  040054  001002                        BNE     5$              ;;FALL THROUGH IF 0
 4979  040056  105716                        TSTB    (SP)            ;;STILL DOING LEADING 0'S?
 4980  040060  100407                        BMI     7$              ;;BR IF YES
 4981  040062  106316                5$:     ASLB    (SP)            ;;MSD?
 4982  040064  103003                        BCC     6$              ;;BR IF NO
 4983  040066  116663  000001  177777        MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
 4984  040074  052702  000060        6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
 4985  040100  052702  000040        7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
 4986  040104  110223                        MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
 4987  040106  005720                        TST     (R0)+           ;;JUST INCREMENTING
 4988  040110  020027  000010                CMP     R0,#10          ;;CHECK THE TABLE INDEX
 4989  040114  002746                        BLT     2$              ;;GO DO THE NEXT DIGIT
 4990  040116  003002                        BGT     8$              ;;GO TO EXIT
 4991  040120  010502                        MOV     R5,R2           ;;GET THE LSD
 4992  040122  000764                        BR      6$              ;;GO CHANGE TO ASCII
 4993  040124  105726                8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
 4994  040126  100003                        BPL     9$              ;;BR IF NO
 4995  040130  116663  177777  177776        MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
 4996  040136  105013                9$:     CLRB    (R3)            ;;SET THE TERMINATOR
 4997  040140  012605                        MOV     (SP)+,R5        ;;POP STACK INTO R5
 4998  040142  012603                        MOV     (SP)+,R3        ;;POP STACK INTO R3
 4999  040144  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
 5000  040146  012601                        MOV     (SP)+,R1        ;;POP STACK INTO R1
 5001  040150  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
 5002  040152  104401  040200                TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
 5003  040156  016666  000002  000004        MOV     2(SP),4(SP)     ;;ADJUST THE STACK
 5004  040164  012616                        MOV     (SP)+,(SP)
 5005  040166  000002                        RTI                     ;;RETURN TO USER
 5006  040170  023420                $DTBL:  10000.
 5007  040172  001750                        1000.
 5008  040174  000144                        100.
 5009  040176  000012                        10.
 5010  040200  000004                $DBLK:  .BLKW   4
 5011                                  .SBTTL  SAVE AND RESTORE R0-R5 ROUTINES
 5012
 5013                                  ;;**********************************************************************
 5014                                  ;*SAVE R0-R5
 5015                                  ;*CALL:
```

```
5016                                    ;*      SAVREG
5017                                    ;*UPON RETURN FROM $SAVREG THE STACK WILL LOOK LIKE:
5018                                    ;*
5019                                    ;*TOP---(+16)
5020                                    ;*  +2---(+18)
5021                                    ;*  +4---R5
5022                                    ;*  +6---R4
5023                                    ;*  +8---R3
5024                                    ;*+10---R2
5025                                    ;*+12---R1
5026                                    ;*+14---R0
5027
5028  040210                            $SAVREG:
5029  040210  010046                            MOV     R0,-(SP)        ;;PUSH R0 ON STACK
5030  040212  010146                            MOV     R1,-(SP)        ;;PUSH R1 ON STACK
5031  040214  010246                            MOV     R2,-(SP)        ;;PUSH R2 ON STACK
5032  040216  010346                            MOV     R3,-(SP)        ;;PUSH R3 ON STACK
5033  040220  010446                            MOV     R4,-(SP)        ;;PUSH R4 ON STACK
5034  040222  010546                            MOV     R5,-(SP)        ;;PUSH R5 ON STACK
5035  040224  016646  000022                    MOV     22(SP),-(SP)    ;;SAVE PS OF MAIN FLOW
5036  040230  016646  000022                    MOV     22(SP),-(SP)    ;;SAVE PC OF MAIN FLOW
5037  040234  016646  000022                    MOV     22(SP),-(SP)    ;;SAVE PS OF CALL
5038  040240  016646  000022                    MOV     22(SP),-(SP)    ;;SAVE PC OF CALL
5039  040244  000002                            RTI
5040
5041                                    ;*RESTORE R0-R5
5042                                    ;*CALL:
5043                                    ;*      RESREG
5044  040246                            $RESREG:
5045  040246  012666  000022                    MOV     (SP)+,22(SP)    ;;RESTORE PC OF CALL
5046  040252  012666  000022                    MOV     (SP)+,22(SP)    ;;RESTORE PS OF CALL
5047  040256  012666  000022                    MOV     (SP)+,22(SP)    ;;RESTORE PC OF MAIN FLOW
5048  040262  012666  000022                    MOV     (SP)+,22(SP)    ;;RESTORE PS OF MAIN FLOW
5049  040266  012605                            MOV     (SP)+,R5        ;;POP STACK INTO R5
5050  040270  012604                            MOV     (SP)+,R4        ;;POP STACK INTO R4
5051  040272  012603                            MOV     (SP)+,R3        ;;POP STACK INTO R3
5052  040274  012602                            MOV     (SP)+,R2        ;;POP STACK INTO R2
5053  040276  012601                            MOV     (SP)+,R1        ;;POP STACK INTO R1
5054  040300  012600                            MOV     (SP)+,R0        ;;POP STACK INTO R0
5055  040302  000002                            RTI
5056                                    .SBTTL  DOUBLE LENGTH BINARY TO OCTAL ASCII CONVERT ROUTINE
5057
5058                                    ;;******************************************************************
5059                                    ;*THIS ROUTINE WILL CONVERT A 32-BIT UNSIGNED BINARY NUMBER TO AN
5060                                    ;*UNSIGNED OCTAL ASCIZ NUMBER.
5061                                    ;*CALL
5062                                    ;*      MOV     #PNTR,-(SP)     ;;POINTER TO LOW WORD OF BINARY NUMBER
5063                                    ;*      JSR     PC,@#$DB2O      ;;CALL THE ROUTINE
5064                                    ;*      RETURN                  ;;THE ADDRESS OF THE FIRST ASCIZ CHAR. IS ON THE STACK
5065
5066
5067  040304  104413                    $DB2O:  SAVREG                  ;;SAVE ALL REGISTERS
5068  040306  016601  000002                    MOV     2(SP),R1        ;;PICKUP THE POINTER TO LOW WORD
5069  040312  012705  040423                    MOV     #$OCTVL+13.,R5  ;;POINTER TO DATA TABLE
5070  040316  012704  000014                    MOV     #12.,R4         ;;DO ELEVEN CHARACTERS
5071  040322  012703  177770                    MOV     #^C7,R3         ;;MASK
```

```
 5072  040326  012100                    MOV     (R1)+,R0        ;;LOWER WORD
 5073  040330  012101                    MOV     (R1)+,R1        ;;HIGH WORD
 5074  040332  005002                    CLR     R2              ;;TERMINATOR
 5075  040334  110245            1$:     MOVB    R2,-(R5)        ;;PUT CHARACTER IN DATA TABLE
 5076  040336  010002                    MOV     R0,R2           ;;GET THIS DIGIT
 5077  040340  005304                    DEC     R4              ;;COUNT THIS CHARACTER
 5078  040342  003007                    BGT     3$              ;;BR IF NOT THE LAST DIGIT
 5079  040344  001405                    BEQ     2$              ;;BR IF IT IS THE LAST DIGIT
 5080  040346  005205                    INC     R5              ;;ALL DIGITS DONE-ADJUST POINTER FOR FIRST
 5081  040350  010566  000002            MOV     R5,2(SP)        ;;ASCIZ CHAR. & PUT IT ON THE STACK
 5082  040354  104414                    RESREG                  ;;RESTORE ALL REGISTERS
 5083  040356  000207                    RTS     PC              ;;RETURN TO USER
 5084  040360  006203            2$:     ASR     R3              ;;POSITION THE MASK FOR THE LAST DIGIT
 5085  040362  006001            3$:     ROR     R1              ;;POSITION THE BINARY NUMBER FOR
 5086  040364  006000                    ROR     R0              ;;      THE NEXT OCTAL DIGIT
 5087  040366  006001                    ROR     R1
 5088  040370  006000                    ROR     R0
 5089  040372  006001                    ROR     R1
 5090  040374  006000                    ROR     R0
 5091  040376  040302                    BIC     R3,R2           ;;MASK OUT ALL JUNK
 5092  040400  062702  000060            ADD     #'0,R2          ;;MAKE THIS CHAR. ASCII
 5093  040404  000753                    BR      1$              ;;GO PUT IT IN THE DATA TABLE
 5094  040406  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.

040424  010046                  $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
040426  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
040432  005740                          TST     -(R0)           ;;BACKUP BY 2
040434  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
040436  006300                          ASL     R0              ;;POSITION FOR INDEXING
040440  016000  040460                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
040444  000200                          RTS     R0              ;;GO TO ROUTINE

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

040446  011646                  $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
040450  016666  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
040456  000002                          RTI                     ;;RESTORE THE PSW

                                .SBTTL  TRAP TABLE

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

                                ;       ROUTINE
                                ;       -------
040460  040446                  $TRPAD: .WORD   $TRAP2
040462  036732                          $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
040464  037562                          $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
040466  037536                          $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
040470  037576                          $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
040472  037764                          $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
040474  037462                          $TYPBN  ;;CALL=TYPBN    TRAP+6(104406)  TYPE BINARY (ASCII) NUMBER

040476  035660                          $GTSWR  ;;CALL=GTSWR    TRAP+7(104407)  GET SOFT-SWR SETTING

040500  035610                          $CKSWR  ;;CALL=CKSWR    TRAP+10(104410) TEST FOR CHANGE IN SOFT-SWR
040502  036132                          $RDCHR  ;;CALL=RDCHR    TRAP+11(104411) TTY TYPEIN CHARACTER ROUTINE
040504  036252                          $RDLIN  ;;CALL=RDLIN    TRAP+12(104412) TTY TYPEIN STRING ROUTINE
040506  040210                          $SAVREG ;;CALL=SAVREG   TRAP+13(104413) SAVE R0-R5 ROUTINE
040510  040246                          $RESREG ;;CALL=RESREG   TRAP+14(104414) RESTORE R0-R5 ROUTINE
                                .SBTTL  POWER DOWN AND UP ROUTINES

                                ;;**********************************************************************
                                ;POWER DOWN ROUTINE
040512  012737  040670  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
040520  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
040526  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
040530  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
040532  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
040534  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
040536  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
```

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 5151  040540  010546                          MOV     R5,-(SP)          ;;PUSH R5 ON STACK
 5152  040542  017746  140372                  MOV     @SWR,-(SP)        ;;PUSH @SWR ON STACK
 5153  040546  010637  040674                  MOV     SP,$SAVR6         ;;SAVE SP
 5154  040552  012737  040564  000024          MOV     #$PWRUP,@#PWRVEC  ;;SET UP VECTOR
 5155  040560  000000                          HALT
 5156  040562  000776                          BR      .-2               ;;HANG UP
 5157
 5158                                  ;;*****************************************************************
 5159                                  ;POWER UP ROUTINE
 5160  040564  012737  040670  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC  ;;SET FOR FAST DOWN
 5161  040572  013706  040674                  MOV     $SAVR6,SP         ;;GET SP
 5162  040576  005037  040674                  CLR     $SAVR6            ;;WAIT LOOP FOR THE TTY
 5163  040602  005237  040674          1$:     INC     $SAVR6            ;;WAIT FOR THE INC
 5164  040606  001375                          BNE     1$                ;;OF  WORD
 5165  040610  012677  140324                  MOV     (SP)+,@SWR        ;;POP STACK INTO @SWR
 5166  040614  012605                          MOV     (SP)+,R5          ;;POP STACK INTO R5
 5167  040616  012604                          MOV     (SP)+,R4          ;;POP STACK INTO R4
 5168  040620  012603                          MOV     (SP)+,R3          ;;POP STACK INTO R3
 5169  040622  012602                          MOV     (SP)+,R2          ;;POP STACK INTO R2
 5170  040624  012601                          MOV     (SP)+,R1          ;;POP STACK INTO R1
 5171  040626  012600                          MOV     (SP)+,R0          ;;POP STACK INTO R0
 5172  040630  012737  040512  000024          MOV     #$PWRDN,@#PWRVEC  ;;SET UP THE POWER DOWN VECTOR
 5173  040636  012737  000340  000026          MOV     #340,@#PWRVEC+2   ;;PRIO:7
 5174  040644  104401                          TYPE                      ;;REPORT THE POWER FAILURE
 5175  040646  040676          $PWRMG: .WORD   PWRMSG                    ;;POWER FAIL MESSAGE POINTER
 5176  040650  012716                          MOV     (PC)+,(SP)        ;;RESTART AT RESTRT
 5177  040652  020472          $PWRAD: .WORD   RESTRT                    ;;RESTART ADDRESS
 5178  040654  042766  000020  000002          BIC     #20,2(SP)         ;;CLEAR "T" BIT
 5179  040662  005037  034144                  CLR     $TBIT             ;;CLEAR THE "T" BIT FLAG
 5180  040666  000002                          RTI
 5181  040670  000000          $ILLUP: HALT                              ;;THE POWER UP SEQUENCE WAS STARTED
 5182  040672  000776                          BR      .-2               ;; BEFORE THE POWER DOWN WAS COMPLETE
 5183  040674  000000          $SAVR6: 0                                 ;;PUT THE SP HERE
 5184  040676  006412  050040  053517  PWRMSG: .ASCIZ   <12><15>? POWER FAILURE - RESTARTING ?<12><15>
 5185  040704  051105  043040  044501
 5186  040712  052514  042522  026440
 5187  040720  051040  051505  040524
 5188  040726  052122  047111  020107
 5189  040734  006412     000
 5190          040740                  .EVEN
 5191
 5192
```

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                                                .SBTTL  ERROR MESSAGES, DATA HEADERS-TABLES & FORMATS
040740  047125  054105  042520  EM1:    .ASCIZ  /UNEXPECTED CPU TRAP TO LOC. 004/
040746  052103  042105  041440
040754  052520  052040  040522
040762  020120  047524  046040
040770  041517  020056  030060
040776  000064
041000  047125  054105  042520  EM2:    .ASCIZ  /UNEXPECTED MEM. MGMT. TRAP TO LOC. 250/
041006  052103  042105  046440
041014  046505  020056  043515
041022  052115  020056  051124
041030  050101  052040  020117
041036  047514  027103  031040
041044  030065     000
041047     120  044522  051117  EM3:    .ASCIZ  /PRIORITY BITS SET WRONG IN PSW/
041054  052111  020131  044502
041062  051524  051440  052105
041070  053440  047522  043516
041076  044440  020116  051520
041104  000127
041106  047515  042504  041040  EM4:    .ASCIZ  /MODE BITS SET WRONG IN PSW/
041114  052111  020123  042523
041122  020124  051127  047117
041130  020107  047111  050040
041136  053523     000
041141     104  040525  020114  EM5:    .ASCIZ  /DUAL ADDRESSING BETWEEN HI&LO BYTES OF PSW/
041146  042101  051104  051505
041154  044523  043516  041040
041162  052105  042527  047105
041170  044040  023111  047514
041176  041040  052131  051505
041204  047440  020106  051520
041212  000127
041214  042513  047122  046105  EM6:    .ASCIZ  /KERNEL R6 CHANGED BY WRITING USER R6/
041222  051040  020066  044103
041230  047101  042507  020104
041236  054502  053440  044522
041244  044524  043516  052440
041252  042523  020122  033122
041260     000
041261     101  046440  046505  EM7:    .ASCIZ  /A MEMORY MGMT. REG. TIMED OUT/
041266  051117  020131  043515
041274  052115  020056  042522
041302  027107  052040  046511
041310  042105  047440  052125
041316     000
041317     123  046525  040515  EM10:   .ASCIZ  /SUMMARY OF MEM. MGMT. REG. TIMEOUTS/
041324  054522  047440  020106
041332  042515  027115  046440
041340  046507  027124  051040
041346  043505  020056  044524
041354  042515  052517  051524
041362     000
041363     115  046505  020056  EM11:   .ASCIZ  /MEM. MGMT. REG. WOULD NOT CLEAR/
041370  043515  052115  020056
041376  042522  027107  053440
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5249  041404  052517  042114  047040
5250  041412  052117  041440  042514
5251  041420  051101     000
5252  041423     115  046505  020056  EM12:   .ASCIZ  /MEM. MGMT. REG. BITS NOT SET CORRECTLY/
5253  041430  043515  052115  020056
5254  041436  042522  027107  041040
5255  041444  052111  020123  047516
5256  041452  020124  042523  020124
5257  041460  047503  051122  041505
5258  041466  046124  000131
5259  041472  051123  020060  043105  EM13:   .ASCIZ  /SR0 EFFECTED BY WRITE TO PSW/
5260  041500  042506  052103  042105
5261  041506  041040  020131  051127
5262  041514  052111  020105  047524
5263  041522  050040  053523     000
5264  041527     123  030522  042040  EM14:   .ASCIZ  /SR1 DID NOT READ ALL ZEROS/
5265  041534  042111  047040  052117
5266  041542  051040  040505  020104
5267  041550  046101  020114  042532
5268  041556  047522  000123
5269  041562  052504  046101  040440  EM15:   .ASCIZ  /DUAL ADDRESSING BETWEEN BYTES OF PAR OR PDR/
5270  041570  042104  042522  051523
5271  041576  047111  020107  042502
5272  041604  053524  042505  020116
5273  041612  054502  042524  020123
5274  041620  043117  050040  051101
5275  041626  047440  020122  042120
5276  041634  000122
5277  041636  052504  046101  040440  EM16:   .ASCIZ  /DUAL ADDRESSING BETWEEN PAR-PDR'S/
5278  041644  042104  042522  051523
5279  041652  047111  020107  042502
5280  041660  053524  042505  020116
5281  041666  040520  026522  042120
5282  041674  023522  000123
5283  041700  044120  051531  041511  EM17:   .ASCIZ  /PHYSICAL ADDRESS FORMED WRONG/
5284  041706  046101  040440  042104
5285  041714  042522  051523  043040
5286  041722  051117  042515  020104
5287  041730  051127  047117  000107
5288  041736  044120  051531  020056  EM20:   .ASCIZ  /PHYS. ADDR. FORMED WRONG IN RELOCATE MODE/
5289  041744  042101  051104  020056
5290  041752  047506  046522  042105
5291  041760  053440  047522  043516
5292  041766  044440  020116  042522
5293  041774  047514  040503  042524
5294  042002  046440  042117  000105
5295  042010  026527  044502  020124  EM21:   .ASCIZ  /W-BIT DID NOT GET SET IN PDR/
5296  042016  044504  020104  047516
5297  042024  020124  042507  020124
5298  042032  042523  020124  047111
5299  042040  050040  051104     000
5300  042045     127  041055  052111  EM22:   .ASCIZ  /W-BIT SET IN MORE THAN ONE PDR/
5301  042052  051440  052105  044440
5302  042060  020116  047515  042522
5303  042066  052040  040510  020116
5304  042074  047117  020105  042120
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5305  042102  000122
5306  042104  026527  044502  020124  EM23:   .ASCIZ  /W-BIT NOT CLEARED BY WRITING TO PDR/
5307  042112  047516  020124  046103
5308  042120  040505  042522  020104
5309  042126  054502  053440  044522
5310  042134  044524  043516  052040
5311  042142  020117  042120  000122
5312  042150  051127  052111  047111  EM24:   .ASCIZ  /WRITING SR0 SET W-BIT IN KIPDR7/
5313  042156  020107  051123  020060
5314  042164  042523  020124  026527
5315  042172  044502  020124  047111
5316  042200  045440  050111  051104
5317  042206  000067
5318  042210  026527  044502  020124  EM25:   .ASCIZ  /W-BIT GOT SET DURING TIMEOUT ABORT/
5319  042216  047507  020124  042523
5320  042224  020124  052504  044522
5321  042232  043516  052040  046511
5322  042240  047505  052125  040440
5323  042246  047502  052122     000
5324  042253     115  046505  051117  EM26:   .ASCIZ  /MEMORY MGMT. ACCESS ABORT DID NOT OCCUR/
5325  042260  020131  043515  052115
5326  042266  020056  041501  042503
5327  042274  051523  040440  047502
5328  042302  052122  042040  042111
5329  042310  047040  052117  047440
5330  042316  041503  051125     000
5331  042323     101  041503  051505  EM27:   .ASCIZ  /ACCESS ERROR DID NOT ABORT INSTRUCTION/
5332  042330  020123  051105  047522
5333  042336  020122  044504  020104
5334  042344  047516  020124  041101
5335  042352  051117  020124  047111
5336  042360  052123  052522  052103
5337  042366  047511  000116
5338  042372  051123  020060  044504  EM30:   .ASCIZ  /SR0 DID NOT REPORT ACCESS ERROR CORRECTLY/
5339  042400  020104  047516  020124
5340  042406  042522  047520  052122
5341  042414  040440  041503  051505
5342  042422  020123  051105  047522
5343  042430  020122  047503  051122
5344  042436  041505  046124  000131
5345  042444  044504  020104  047516  EM31:   .ASCIZ  /DID NOT LOCKUP CORRECT VIRTUAL ADDR./
5346  042452  020124  047514  045503
5347  042460  050125  041440  051117
5348  042466  042522  052103  053040
5349  042474  051111  052524  046101
5350  042502  040440  042104  027122
5351  042510     000
5352  042511     120  043501  020105  EM32:   .ASCIZ  /PAGE LGTH. ABORT OCCURRED WHEN IT SHOULDN'T HAVE/
5353  042516  043514  044124  020056
5354  042524  041101  051117  020124
5355  042532  041517  052503  051122
5356  042540  042105  053440  042510
5357  042546  020116  052111  051440
5358  042554  047510  046125  047104
5359  042562  052047  044040  053101
5360  042570  000105
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5361  042572  040520  042507  046040  EM33:   .ASCIZ  /PAGE LGTH. ABORT DID NOT OCCUR WHEN IT SHOULD HAVE/
5362  042600  052107  027110  040440
5363  042606  047502  052122  042040
5364  042614  042111  047040  052117
5365  042622  047440  041503  051125
5366  042630  053440  042510  020116
5367  042636  052111  051440  047510
5368  042644  046125  020104  040510
5369  042652  042526     000
5370  042655     123  030122  042040  EM34:   .ASCIZ  /SR0 DID NOT REPORT PAGE LGTH. ABORT CORRECTLY/
5371  042662  042111  047040  052117
5372  042670  051040  050105  051117
5373  042676  020124  040520  042507
5374  042704  046040  052107  027110
5375  042712  040440  047502  052122
5376  042720  041440  051117  042522
5377  042726  052103  054514     000
5378  042733     123  030122  047440  EM37:   .ASCIZ  /SR0 OR SR2 CHANGED BY A SECOND ABORT/
5379  042740  020122  051123  020062
5380  042746  044103  047101  042507
5381  042754  020104  054502  040440
5382  042762  051440  041505  047117
5383  042770  020104  041101  051117
5384  042776  000124
5385  043000  051123  020060  051117  EM40:   .ASCIZ  /SR0 OR SR2 WERE NOT 'RESET' BY A RESET/
5386  043006  051440  031122  053440
5387  043014  051105  020105  047516
5388  043022  020124  051042  051505
5389  043030  052105  020042  054502
5390  043036  040440  051040  051505
5391  043044  052105     000
5392  043047     123  031122  047040  EM41:   .ASCIZ  /SR2 NOT TRACKING CORRECTLY/
5393  043054  052117  052040  040522
5394  043062  045503  047111  020107
5395  043070  047503  051122  041505
5396  043076  046124  000131
5397  043102  044504  020104  047516  EM42:   .ASCIZ  /DID NOT TRAP THRU KERNEL SPACE/
5398  043110  020124  051124  050101
5399  043116  052040  051110  020125
5400  043124  042513  047122  046105
5401  043132  051440  040520  042503
5402  043140     000
5403  043141     113  020124  051105  EM43:   .ASCIZ  /KT ERROR NOT SERVICED ON TIMEOUT ERROR/
5404  043146  047522  020122  047516
5405  043154  020124  042523  053122
5406  043162  041511  042105  047440
5407  043170  020116  044524  042515
5408  043176  052517  020124  051105
5409  043204  047522  000122
5410  043210  051123  020060  051117  EM44:   .ASCIZ  /SR0 OR SR2 CHANGED BY TIMEOUT ERROR/
5411  043216  051440  031122  041440
5412  043224  040510  043516  042105
5413  043232  041040  020131  044524
5414  043240  042515  052517  020124
5415  043246  051105  047522  000122
5416  043254  051105  047522  020122  EM45:   .ASCIZ  /ERROR DURING 'DOUBLE ERROR' (KT & TIMEOUT)/
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5417  043262  052504  044522  043516
5418  043270  021040  047504  041125
5419  043276  042514  042440  051122
5420  043304  051117  020042  045450
5421  043312  020124  020046  044524
5422  043320  042515  052517  024524
5423  043326     000
5424  043327     115  050106  020111  EM46:   .ASCIZ  /MFPI INSTRUCTION PUSHED WRONG DATA/
5425  043334  047111  052123  052522
5426  043342  052103  047511  020116
5427  043350  052520  044123  042105
5428  043356  053440  047522  043516
5429  043364  042040  052101  000101
5430  043372  052115  044520  044440  EM47:   .ASCIZ  /MTPI INSTRUCTION LOADED WRONG DATA/
5431  043400  051516  051124  041525
5432  043406  044524  047117  046040
5433  043414  040517  042504  020104
5434  043422  051127  047117  020107
5435  043430  040504  040524     000
5436  043435     123  040524  045503  EM50:   .ASCIZ  /STACK NOT PUSHED BY MFPI-MTPI/
5437  043442  047040  052117  050040
5438  043450  051525  042510  020104
5439  043456  054502  046440  050106
5440  043464  026511  052115  044520
5441  043472     000
5442  043473     113  051105  042516  EM51:   .ASCIZ  /KERNEL PAGE ACCESS INSTEAD OF USER: MFPI-MTPI/
5443  043500  020114  040520  042507
5444  043506  040440  041503  051505
5445  043514  020123  047111  052123
5446  043522  040505  020104  043117
5447  043530  052440  042523  035122
5448  043536  046440  050106  026511
5449  043544  052115  044520     000
5450  043551     127  047522  043516  EM52:   .ASCIZ  /WRONG PDR'S REFERENCED WHILE IN RELOCATE MODE/
5451  043556  050040  051104  051447
5452  043564  051040  043105  051105
5453  043572  047105  042503  020104
5454  043600  044127  046111  020105
5455  043606  047111  051040  046105
5456  043614  041517  052101  020105
5457  043622  047515  042504     000
5458  043627     115  050106  020104  EM53:   .ASCIZ  /MFPD INSTRUCTION PUSHED WRONG DATA/
5459  043634  047111  052123  052522
5460  043642  052103  047511  020116
5461  043650  052520  044123  042105
5462  043656  053440  047522  043516
5463  043664  042040  052101  000101
5464  043672  052123  041501  020113  EM54:   .ASCIZ  /STACK NOT PUSHED BY MFPD-MTPD/
5465  043700  047516  020124  052520
5466  043706  044123  042105  041040
5467  043714  020131  043115  042120
5468  043722  046455  050124  000104
5469  043730  040520  020122  051117  EM55:   .ASCIZ  /PAR OR PDR CHANGED BY A RESET/
5470  043736  050040  051104  041440
5471  043744  040510  043516  042105
5472  043752  041040  020131  020101
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 5473  043760  042522  042523  000124
 5474  043766  051520  020127  044103  EM56:   .ASCIZ  /PSW CHANGED BY AN RTI IN USER MODE/
 5475  043774  047101  042507  020104
 5476  044002  054502  040440  020116
 5477  044010  052122  020111  047111
 5478  044016  052440  042523  020122
 5479  044024  047515  042504     000
 5480
 5481  044031     117  042114  050040  DH1:    .ASCIZ  /OLD PC  OLD PSW R6 WAS  TESTNO  ERRORPC/
 5482  044036  020103  047440  042114
 5483  044044  050040  053523  051040
 5484  044052  020066  040527  020123
 5485  044060  052040  051505  047124
 5486  044066  020117  042440  051122
 5487  044074  051117  041520     000
 5488  044101     117  042114  050040  DH2:    .ASCIZ  /OLD PC  OLD PSW R6 WAS  SR0     SR2     TESTNO  ERRORPC/
 5489  044106  020103  047440  042114
 5490  044114  050040  053523  051040
 5491  044122  020066  040527  020123
 5492  044130  051440  030122  020040
 5493  044136  020040  051440  031122
 5494  044144  020040  020040  052040
 5495  044152  051505  047124  020117
 5496  044160  042440  051122  051117
 5497  044166  041520     000
 5498  044171     127  047522  042524  DH3:    .ASCIZ  /WROTE   READ    TESTNO  ERRORPC/
 5499  044176  020040  051040  040505
 5500  044204  020104  020040  052040
 5501  044212  051505  047124  020117
 5502  044220  042440  051122  051117
 5503  044226  041520     000
 5504  044231     101  042104  042522  DH7:    .ASCIZ  /ADDRESS TESTNO  ERRORPC/
 5505  044236  051523  052040  051505
 5506  044244  047124  020117  042440
 5507  044252  051122  051117  041520
 5508  044260     000
 5509  044261     122  043505  051511  DH10:   .ASCII  /REGISTER-ADDRS  NUM  OF/<CRLF>
 5510  044266  042524  026522  042101
 5511  044274  051104  020123  047040
 5512  044302  046525  020040  043117
 5513  044310     200
 5514  044311     101  042116  042455          .ASCIZ  /AND-ED  OR-ED   TIMOUTS TESTNO  ERRORPC/
 5515  044316  020104  047440  026522
 5516  044324  042105  020040  052040
 5517  044332  046511  052517  051524
 5518  044340  052040  051505  047124
 5519  044346  020117  042440  051122
 5520  044354  051117  041520     000
 5521  044361     122  043505  051511  DH11:   .ASCII  /REGISTR READ    READ-(BINARY)/<CRLF>
 5522  044366  051124  051040  040505
 5523  044374  020104  020040  051040
 5524  044402  040505  026504  041050
 5525  044410  047111  051101  024531
 5526  044416     200
 5527  044417     101  042104  042522          .ASCIZ  /ADDRESS (OCTAL) 5432109876543210  TESTNO  ERRORPC/
 5528  044424  051523  024040  041517
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 5529  044432  040524  024514  032440
 5530  044440  031464  030462  034460
 5531  044446  033470  032466  031464
 5532  044454  030462  020060  052040
 5533  044462  051505  047124  020117
 5534  044470  042440  051122  051117
 5535  044476  041520     000
 5536  044501     122  043505  051511  DH12:   .ASCII  /REGISTR WROTE   READ    READ-(BINARY)/<CRLF>
 5537  044506  051124  053440  047522
 5538  044514  042524  020040  051040
 5539  044522  040505  020104  020040
 5540  044530  051040  040505  026504
 5541  044536  041050  047111  051101
 5542  044544  024531     200
 5543  044547     101  042104  042522          .ASCIZ  /ADDRESS (OCTAL) (OCTAL) 5432109876543210  TESTNO  ERRORPC/
 5544  044554  051523  024040  041517
 5545  044562  040524  024514  024040
 5546  044570  041517  040524  024514
 5547  044576  032440  031464  030462
 5548  044604  034460  033470  032466
 5549  044612  031464  030462  020060
 5550  044620  052040  051505  047124
 5551  044626  020117  042440  051122
 5552  044634  051117  041520     000
 5553  044641     122  040505  020104  DH13:   .ASCIZ  /READ    TESTNO  ERRORPC/
 5554  044646  020040  052040  051505
 5555  044654  047124  020117  042440
 5556  044662  051122  051117  041520
 5557  044670     000
 5558  044671     120  051101  050055  DH16:   .ASCII  /PAR-PDR PAR-PDR/<CRLF>
 5559  044676  051104  050040  051101
 5560  044704  050055  051104     200
 5561  044711     103  042514  051101          .ASCIZ  /CLEARED EFFECTD EXPECTD RECEIVD TESTNO  ERRORPC/
 5562  044716  042105  042440  043106
 5563  044724  041505  042124  042440
 5564  044732  050130  041505  042124
 5565  044740  051040  041505  044505
 5566  044746  042126  052040  051505
 5567  044754  047124  020117  042440
 5568  044762  051122  051117  041520
 5569  044770     000
 5570  044771     120  054510  044523  DH17:   .ASCII  /PHYSICL VIRTUAL/<CRLF>
 5571  044776  046103  053040  051111
 5572  045004  052524  046101     200
 5573  045011     101  042104  042522          .ASCIZ  /ADDRESS ADDRESS KIPAR4  TESTNO  ERRORPC/
 5574  045016  051523  040440  042104
 5575  045024  042522  051523  045440
 5576  045032  050111  051101  020064
 5577  045040  052040  051505  047124
 5578  045046  020117  042440  051122
 5579  045054  051117  041520     000
 5580  045061     120  054510  044523  DH20:   .ASCII  /PHYSICL PAR 4   PAR 5/<CRLF>
 5581  045066  046103  050040  051101
 5582  045074  032040  020040  050040
 5583  045102  051101  032440     200
 5584  045107     101  042104  042522          .ASCIZ  /ADDRESS VBA     VBA     PAR 4   PAR 5   PSW     TESTNO  ERRORPC/
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5585  045114  051523  053040  040502
5586  045122  020040  020040  053040
5587  045130  040502  020040  020040
5588  045136  050040  051101  032040
5589  045144  020040  050040  051101
5590  045152  032440  020040  050040
5591  045160  053523  020040  020040
5592  045166  052040  051505  047124
5593  045174  020117  042440  051122
5594  045202  051117  041520     000
5595  045207     120  051104  020040  DH21:   .ASCII  /PDR     VIRTUAL/<CRLF>
5596  045214  020040  053040  051111
5597  045222  052524  046101     200
5598  045227     124  051505  042524          .ASCIZ  /TESTED  ADDRESS TESTNO  ERRORPC/
5599  045234  020104  040440  042104
5600  045242  042522  051523  052040
5601  045250  051505  047124  020117
5602  045256  042440  051122  051117
5603  045264  041520     000
5604  045267     120  051104  044440  DH22:   .ASCII  /PDR IN  PDR     VIRTUAL/
5605  045274  020116  050040  051104
5606  045302  020040  020040  053040
5607  045310  051111  052524  046101
5608  045316  051105  047522  020122          .ASCIZ  /ERROR   TESTED  ADDRESS TESTNO  ERRORPC/
5609  045324  020040  042524  052123
5610  045332  042105  020040  042101
5611  045340  051104  051505  020123
5612  045346  042524  052123  047516
5613  045354  020040  051105  047522
5614  045362  050122  000103
5615  045366  042120  020122  020040  DH23:   .ASCIZ  /PDR     TESTNO  ERRORPC/
5616  045374  020040  042524  052123
5617  045402  047516  020040  051105
5618  045410  047522  050122  000103
5619  045416  042120  020122  040527  DH24:   .ASCIZ  /PDR WAS EXPECTD TESTNO  ERRORPC/
5620  045424  020123  054105  042520
5621  045432  052103  020104  042524
5622  045440  052123  047516  020040
5623  045446  051105  047522  050122
5624  045454  000103
5625  045456  042120  020122  020064  DH26:   .ASCIZ  /PDR 4   PSW     TESTNO  ERRORPC/
5626  045464  020040  051520  020127
5627  045472  020040  020040  042524
5628  045500  052123  047516  020040
5629  045506  051105  047522  050122
5630  045514  000103
5631  045516  051123  020060  040527  DH30:   .ASCIZ  /SR0 WAS EXPECTD PDR 4   PSW     TESTNO  ERRORPC/
5632  045524  020123  054105  042520
5633  045532  052103  020104  042120
5634  045540  020122  020064  020040
5635  045546  051520  020127  020040
5636  045554  020040  042524  052123
5637  045562  047516  020040  051105
5638  045570  047522  050122  000103
5639  045576  051123  020062  040527  DH31:   .ASCIZ  /SR2 WAS EXPECTD PDR 4   PSW     TESTNO  ERRORPC/
5640  045604  020123  054105  042520
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5641  045612  052103  020104  042120
5642  045620  020122  020064  020040
5643  045626  051520  020127  020040
5644  045634  020040  042524  052123
5645  045642  047516  020040  051105
5646  045650  047522  050122  000103
5647  045656  027126  027102  027101  DH32:   .ASCIZ  /V.B.A.  KIPDR4  SR0 WAS SR2 WAS TESTNO  ERRORPC/
5648  045664  020040  044513  042120
5649  045672  032122  020040  051123
5650  045700  020060  040527  020123
5651  045706  051123  020062  040527
5652  045714  020123  042524  052123
5653  045722  047516  020040  051105
5654  045730  047522  050122  000103
5655  045736  027126  027102  027101  DH33:   .ASCIZ  /V.B.A.  KIPDR4  TESTNO  ERRORPC/
5656  045744  020040  044513  042120
5657  045752  032122  020040  042524
5658  045760  052123  047516  020040
5659  045766  051105  047522  050122
5660  045774  000103
5661  045776  027126  027102  027101  DH34:   .ASCIZ  /V.B.A.  KIPDR4  SR0 WAS EXPECTD TESTNO  ERRORPC/
5662  046004  020040  044513  042120
5663  046012  032122  020040  051123
5664  046020  020060  040527  020123
5665  046026  054105  042520  052103
5666  046034  020104  042524  052123
5667  046042  047516  020040  051105
5668  046050  047522  050122  000103
5669  046056  027126  027102  027101  DH35:   .ASCIZ  /V.B.A.  KIPDR4  SR2 WAS EXPECTD TESTNO  ERRORPC/
5670  046064  020040  044513  042120
5671  046072  032122  020040  051123
5672  046100  020062  040527  020123
5673  046106  054105  042520  052103
5674  046114  020104  042524  052123
5675  046122  047516  020040  051105
5676  046130  047522  050122  000103
5677  046136  051123  020062  040527  DH36:   .ASCIZ  /SR2 WAS EXPECTD TESTNO  ERRORPC/
5678  046144  020123  054105  042520
5679  046152  052103  020104  042524
5680  046160  052123  047516  020040
5681  046166  051105  047522  050122
5682  046174  000103
5683  046176  044506  051522  020124  DH37:   .ASCII  /FIRST ABORT     SECOND ABORT/<CRLF>
5684  046204  041101  051117  020124
5685  046212  020040  020040  042523
5686  046220  047503  042116  040440
5687  046226  047502  052122     200
5688  046233     123  030122  053440          .ASCIZ  /SR0 WAS SR2 WAS SR0 WAS SR2 WAS TESTNO  ERRORPC/
5689  046240  051501  051440  031122
5690  046246  053440  051501  051440
5691  046254  030122  053440  051501
5692  046262  051440  031122  053440
5693  046270  051501  052040  051505
5694  046276  047124  020117  042440
5695  046304  051122  051117  041520
5696  046312     000
```

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5697  046313     123  030122  053440  DH40:   .ASCIZ  /SR0 WAS SR2 WAS TESTNO  ERRORPC/
5698  046320  051501  051440  031122
5699  046326  053440  051501  052040
5700  046334  051505  047124  020117
5701  046342  042440  051122  051117
5702  046350  041520     000
5703  046353     120  053523  053440  DH42:   .ASCIZ  /PSW WAS R6 WAS  TESTNO  ERRORPC/
5704  046360  051501  051040  020066
5705  046366  040527  020123  052040
5706  046374  051505  047124  020117
5707  046402  042440  051122  051117
5708  046410  041520     000
5709  046413     105  050130  041505  DH44:   .ASCII  /EXPECTED         RECEIVED/<CRLF>
5710  046420  042524  020104  020040
5711  046426  020040  020040  020040
5712  046434  042522  042503  053111
5713  046442  042105     200
5714  046445     123  030122  020040          .ASCIZ  /SR0      SR2     SR0 WAS SR2 WAS TESTNO  ERRORPC/
5715  046452  020040  051440  031122
5716  046460  020040  020040  051440
5717  046466  030122  053440  051501
5718  046474  051440  031122  053440
5719  046502  051501  052040  051505
5720  046510  047124  020117  042440
5721  046516  051122  051117  041520
5722  046524     000
5723  046525     105  050130  041505  DH45:   .ASCII  /EXPECTED:/<CRLF>
5724  046532  042524  035104     200
5725  046537     120  053523  020040          .ASCII  /PSW      PC       SR0      SR2/<CRLF>
5726  046544  020040  050040  020103
5727  046552  020040  020040  051440
5728  046560  030122  020040  020040
5729  046566  051440  031122     200
5730  046573     061  030067  030460          .ASCII  /170017  (3$+4)  020147  (3$)/<CRLF>
5731  046600  020067  024040  022063
5732  046606  032053  020051  030040
5733  046614  030062  032061  020067
5734  046622  024040  022063  100051
5735  046630  042522  042503  053111          .ASCII  /RECEIVED:/<CRLF>
5736  046636  042105  100072
5737  046642  051520  020127  020040          .ASCIZ  /PSW      PC       SR0      SR2      TESTNO  ERRORPC/
5738  046650  020040  041520  020040
5739  046656  020040  020040  051123
5740  046664  020060  020040  020040
5741  046672  051123  020062  020040
5742  046700  020040  042524  052123
5743  046706  047516  020040  051105
5744  046714  047522  050122  000103
5745  046722  040504  040524  020040  DH46:   .ASCII  /DATA     DATA/<CRLF>
5746  046730  020040  040504  040524
5747  046736     200
5748  046737     105  050130  041505          .ASCIZ  /EXPECTD RECEIVD TESTNO  ERRORPC/
5749  046744  042124  051040  041505
5750  046752  044505  042126  052040
5751  046760  051505  047124  020117
5752  046766  042440  051122  051117
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5753  046774  041520     000
5754  046777     124  051505  047124  DH50:   .ASCIZ  /TESTNO  ERRORPC/
5755  047004  020117  042440  051122
5756  047012  051117  041520     000
5757  047017     123  030122  053440  DH51:   .ASCIZ  /SR0 WAS SR2 WAS TESTNO  ERRORPC/
5758  047024  051501  051440  031122
5759  047032  053440  051501  052040
5760  047040  051505  047124  020117
5761  047046  042440  051122  051117
5762  047054  041520     000
5763  047057     120  054510  044523  DH52:   .ASCII  /PHYSICL PAR 4/<CRLF>
5764  047064  046103  050040  051101
5765  047072  032040     200
5766  047075     101  042104  042522          .ASCIZ  /ADDRESS V.B.A.  PAR 4   SR0 WAS SR2 WAS PSW     TESTNO  ERRORPC/
5767  047102  051523  053040  041056
5768  047110  040456  020056  050040
5769  047116  051101  032040  020040
5770  047124  051440  030122  053440
5771  047132  051501  051440  031122
5772  047140  053440  051501  050040
5773  047146  053523  020040  020040
5774  047154  052040  051505  047124
5775  047162  020117  042440  051122
5776  047170  051117  041520     000
5777  047175     120  053523  053440  DH56:   .ASCIZ  /PSW WAS EXPECTD TESTNO  ERRORPC/
5778  047202  051501  042440  050130
5779  047210  041505  042124  052040
5780  047216  051505  047124  020117
5781  047224  042440  051122  051117
5782  047232  041520     000
5783
5784          047236                          .EVEN
5785
5786  047236  001266  001270  001264  DT1:    .WORD   TRAPPC,TRAPPS,WASR6,TESTNO,$ERRPC,0
5787  047244  001262  001116  000000
5788  047252  001266  001270  001264  DT2:    .WORD   TRAPPC,TRAPPS,WASR6,WASSR0,WASSR2,TESTNO,$ERRPC,0
5789  047260  001272  001274  001262
5790  047266  001116  000000
5791  047272  001162  001164  001262  DT3:    .WORD   $REG0,$REG1,TESTNO,$ERRPC,0
5792  047300  001116  000000
5793  047304  001162  001262  001116  DT7:    .WORD   $REG0,TESTNO,$ERRPC,0
5794  047312  000000
5795  047314  001300  001302  001304  DT10:   .WORD   ANDADR,ORADR,TONUM,TESTNO,$ERRPC,0
5796  047322  001262  001116  000000
5797  047330  001162  001164  001164  DT11:   .WORD   $REG0,$REG1,$REG1,TESTNO,$ERRPC,0
5798  047336  001262  001116  000000
5799  047344  001162  001164  001166  DT12:   .WORD   $REG0,$REG1,$REG2,$REG2,TESTNO,$ERRPC,0
5800  047352  001166  001262  001116
5801  047360  000000
5802  047362  001162  001262  001116  DT13:   .WORD   $REG0,TESTNO,$ERRPC,0
5803  047370  000000
5804  047372  001162  001164  001174  DT16:   .WORD   $REG0,$REG1,$REG5,$REG2,TESTNO,$ERRPC,0
5805  047400  001166  001262  001116
5806  047406  000000
5807  047410  001312  001306  001172  DT17:   .WORD   PBALO,VIRT1,$REG4,TESTNO,$ERRPC,0
5808  047416  001262  001116  000000
```

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 5809  047424  001312  001306  001310  DT20:   .WORD   PBALO,VIRT1,VIRT2,$REG4,$REG5,$TMP0,TESTNO,$ERRPC,0
 5810  047432  001172  001174  001176
 5811  047440  001262  001116  000000
 5812  047446  001174  001170  001262  DT21:   .WORD   $REG5,$REG3,TESTNO,$ERRPC,0
 5813  047454  001116  000000
 5814  047460  001162  001174  001170  DT22:   .WORD   $REG0,$REG5,$REG3,TESTNO,$ERRPC,0
 5815  047466  001262  001116  000000
 5816  047474  001174  001262  001116  DT23:   .WORD   $REG5,TESTNO,$ERRPC,0
 5817  047502  000000
 5818  047504  001166  001164  001262  DT24:   .WORD   $REG2,$REG1,TESTNO,$ERRPC,0
 5819  047512  001116  000000
 5820  047516  001166  001176  001262  DT26:   .WORD   $REG2,$TMP0,TESTNO,$ERRPC,0
 5821  047524  001116  000000
 5822  047530  001272  001170  001166  DT30:   .WORD   WASSR0,$REG3,$REG2,$TMP0,TESTNO,$ERRPC,0
 5823  047536  001176  001262  001116
 5824  047544  000000
 5825  047546  001274  001172  001166  DT31:   .WORD   WASSR2,$REG4,$REG2,$TMP0,TESTNO,$ERRPC,0
 5826  047554  001176  001262  001116
 5827  047562  000000
 5828  047564  001162  001172  001272  DT32:   .WORD   $REG0,$REG4,WASSR0,WASSR2,TESTNO,$ERRPC,0
 5829  047572  001274  001262  001116
 5830  047600  000000
 5831  047602  001162  001172  001262  DT33:   .WORD   $REG0,$REG4,TESTNO,$ERRPC,0
 5832  047610  001116  000000
 5833  047614  001162  001172  001272  DT34:   .WORD   $REG0,$REG4,WASSR0,$REG2,TESTNO,$ERRPC,0
 5834  047622  001166  001262  001116
 5835  047630  000000
 5836  047632  001162  001172  001274  DT35:   .WORD   $REG0,$REG4,WASSR2,$REG3,TESTNO,$ERRPC,0
 5837  047640  001170  001262  001116
 5838  047646  000000
 5839  047650  001274  001164  001262  DT36:   .WORD   WASSR2,$REG1,TESTNO,$ERRPC,0
 5840  047656  001116  000000
 5841  047662  001176  001202  001272  DT37:   .WORD   $TMP0,$TMP2,WASSR0,WASSR2,TESTNO,$ERRPC,0
 5842  047670  001274  001262  001116
 5843  047676  000000
 5844  047700  001272  001274  001262  DT40:   .WORD   WASSR0,WASSR2,TESTNO,$ERRPC,0
 5845  047706  001116  000000
 5846  047712  001164  001166  001262  DT42:   .WORD   $REG1,$REG2,TESTNO,$ERRPC,0
 5847  047720  001116  000000
 5848  047724  001162  001164  001272  DT44:   .WORD   $REG0,$REG1,WASSR0,WASSR2,TESTNO,$ERRPC,0
 5849  047732  001274  001262  001116
 5850  047740  000000
 5851  047742  001164  001170  001272  DT45:   .WORD   $REG1,$REG3,WASSR0,WASSR2,TESTNO,$ERRPC,0
 5852  047750  001274  001262  001116
 5853  047756  000000
 5854  047760  001162  001164  001262  DT46:   .WORD   $REG0,$REG1,TESTNO,$ERRPC,0
 5855  047766  001116  000000
 5856  047772  001262  001116  000000  DT50:   .WORD   TESTNO,$ERRPC,0
 5857  050000  001272  001274  001262  DT51:   .WORD   WASSR0,WASSR2,TESTNO,$ERRPC,0
 5858  050006  001116  000000
 5859  050012  001312  001306  001172  DT52:   .WORD   PBALO,VIRT1,$REG4,WASSR0,WASSR2,$TMP0,TESTNO,$ERRPC,0
 5860  050020  001272  001274  001176
 5861  050026  001262  001116  000000
 5862  050034  001164  001166  001262  DT56:   .WORD   $REG1,$REG2,TESTNO,$ERRPC,0
 5863  050042  001116  000000
 5864
```

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 5865  050046      000      000      000  DF1:     .BYTE   0,0,0,0,0
 5866  050051      000      000
 5867  050053      000      000      000  DF2:     .BYTE   0,0,0,0,0,0,0
 5868  050056      000      000      000
 5869  050061      000
 5870  050062      000      000      000  DF3:     .BYTE   0,0,0,0
 5871  050065      000
 5872  050066      000      000      000  DF7:     .BYTE   0,0,0
 5873  050071      000      000      001  DF10:    .BYTE   0,0,1,0,0
 5874  050074      000      000
 5875  050076      000      000      002  DF11.    .BYTE   0,0,2,0,0
 5876  050101      000      000
 5877  050103      000      000      000  DF12:    .BYTE   0,0,0,2,0,0
 5878  050106      002      000      000
 5879  050111      000      000      000  DF13:    .BYTE   0,0,0
 5880  050114      000      000      000  DF16.    .BYTE   0,0,0,0,0,0
 5881  050117      000      000      000
 5882  050122      003      000      000  DF17:    .BYTE   3,0,0,0,0
 5883  050125      000      000
 5884  050127      003      000      000  DF20:    .BYTE   3,0,0,0,0,0,0,0
 5885  050132      000      000      000
 5886  050135      000      000
 5887  050137      000      000      000  DF21:    .BYTE   0,0,0,0
 5888  050142      000
 5889  050143      000      000      000  DF22:    .BYTE   0,0,0,0,0
 5890  050146      000      000
 5891  050150      000      000      000  DF23:    .BYTE   0,0,0
 5892  050153      000      000      000  DF24:    .BYTE   0,0,0,0
 5893  050156      000
 5894  050157      000      000      000  DF30:    .BYTE   0,0,0,0,0,0
 5895  050162      000      000      000
 5896  050165      000      000      000  DF46:    .BYTE   0,0,0,0
 5897  050170      000
 5898  050171      000      000           DF50:    .BYTE   0,0
 5899  050173      000      000      000  DF51:    .BYTE   0,0,0,0
 5900  050176      000
 5901  050177      003      000      000  DF52:    .BYTE   3,0,0,0,0,0,0,0
 5902  050202      000      000      000
 5903  050205      000      000
 5904  050207      000      000      000  DF56:    .BYTE   0,0,0,0
 5905  050212      000
 5906
 5907              000001                         .END
```

```
ABASE = 000000
ACDW1 = 000000
ACDW2 = 000000
ACPUOP= 000000
ADDW0 = 000000
ADDW1 = 000000
ADDW10= 000000
ADDW11= 000000
ADDW12= 000000
ADDW13= 000000
ADDW14= 000000
ADDW15= 000000
ADDW2 = 000000
ADDW3 = 000000
ADDW4 = 000000
ADDW5 = 000000
ADDW6 = 000000
ADDW7 = 000000
ADDW8 = 000000
ADDW9 = 000000
ADEVCT= 000000
ADEVM = 000000
AENV  = 000000
AENVM = 000000
AFATAL= 000000
AMADR1= 000000
AMADR2= 000000
AMADR3= 000000
AMADR4= 000000
AMAMS1= 000000
AMAMS2= 000000
AMAMS3= 000000
AMAMS4= 000000
AMSGAD= 000000
AMSGLG= 000000
AMSGTY= 000000
AMTYP1= 000000
AMTYP2= 000000
AMTYP3= 000000
AMTYP4= 000000
ANDADR  001300
APASS = 000000
APRIOR= 000000
APTCSU= 000040
APTENV= 000001
APTSIZ= 000200
APTSPO= 000100
ASWREG= 000000
ATESTN= 000000
AUNIT = 000000
AUSWR = 000000
AVECT1= 000000
AVECT2= 000000
BIT0  = 000001
BIT00 = 000001
BIT01 = 000002
BIT02 = 000004
BIT03 = 000010
BIT04 = 000020
BIT05 = 000040
BIT06 = 000100
BIT07 = 000200
BIT08 = 000400
BIT09 = 001000
BIT1  = 000002
BIT10 = 002000
BIT11 = 004000
BIT12 = 010000
BIT13 = 020000
BIT14 = 040000
BIT15 = 100000
BIT2  = 000004
BIT3  = 000010
BIT4  = 000020
BIT5  = 000040
BIT6  = 000100
BIT7  = 000200
BIT8  = 000400
BIT9  = 001000
BPTVEC= 000014
CKSWR = 104410
CMPREG  035274
CMSG    036661
CNTRLC  036602
CR    = 000015
CRLF  = 000200
DALTB1  027006
DALTB2  027042
DALTB3  027354
DALTB4  027410
DDISP = 177570
DF1     050046
DF10    050071
DF11    050076
DF12    050103
DF13    050111
DF16    050114
DF17    050122
DF2     050053
DF20    050127
DF21    050137
DF22    050143
DF23    050150
DF24    050153
DF3     050062
DF30    050157
DF46    050165
DF50    050171
DF51    050173
DF52    050177
DF56    050207
DF7     050066
DH1     044031
DH10    044261
DH11    044361
DH12    044501
DH13    044641
DH16    044671
DH17    044771
DH2     044101
DH20    045061
DH21    045207
DH22    045267
DH23    045366
DH24    045416
DH26    045456
DH3     044171
DH30    045516
DH31    045576
DH32    045656
DH33    045736
DH34    045776
DH35    046056
DH36    046136
DH37    046176
DH40    046313
DH42    046353
DH44    046413
DH45    046525
DH46    046722
DH50    046777
DH51    047017
DH52    047057
DH56    047175
DH7     044231
DISPLA  001142
DISPRE  000174
DSWR  = 177570
DT1     047236
DT10    047314
DT11    047330
DT12    047344
DT13    047362
DT16    047372
DT17    047410
DT2     047252
DT20    047424
DT21    047446
DT22    047460
DT23    047474
DT24    047504
DT26    047516
DT3     047272
DT30    047530
DT31    047546
DT32    047564
DT33    047602
DT34    047614
DT35    047632
DT36    047650
DT37    047662
DT40    047700
DT42    047712
DT44    047724
DT45    047742
DT46    047760
DT50    047772
DT51    050000
DT52    050012
DT56    050034
DT7     047304
EMTVEC= 000030
EM1     040740
EM10    041317
EM11    041363
EM12    041423
EM13    041472
EM14    041527
EM15    041562
EM16    041636
EM17    041700
EM2     041000
EM20    041736
EM21    042010
EM22    042045
EM23    042104
EM24    042150
EM25    042210
EM26    042253
EM27    042323
EM3     041047
EM30    042372
EM31    042444
EM32    042511
EM33    042572
EM34    042655
EM37    042733
EM4     041106
EM40    043000
EM41    043047
EM42    043102
EM43    043141
EM44    043210
EM45    043254
EM46    043327
EM47    043372
EM5     041141
EM50    043435
EM51    043473
EM52    043551
EM53    043627
EM54    043672
EM55    043730
EM56    043766
EM6     041214
EM7     041261
ERRTYP  034670
ERRVEC= 000004
FORMPA  035466
GTSWR = 104407
HT    = 000011
IOTVEC= 000020
KERSTK= 001100
KIPAR0= 172340
KIPAR1= 172342
KIPAR2= 172344
KIPAR3= 172346
KIPAR4= 172350
KIPAR5= 172352
KIPAR6= 172354
KIPAR7= 172356
KIPDR0= 172300
KIPDR1= 172302
KIPDR2= 172304
KIPDR3= 172306
KIPDR4= 172310
KIPDR5= 172312
KIPDR6= 172314
KIPDR7= 172316
KSP   =%000006
LF    = 000012
LOOP    020514
MGMERR  002150
MGMFLG  002152
MMVEC = 000250
ORADR   001302
PBAHI   001314
PBALO   001312
PDRTB1  027024
PDRTB2  027056
PDRTB3  027372
PDRTB4  027424
PIRQ  = 177772
PIRQVE= 000240
PR0   = 000000
```

```
PR1     = 000040
PR2     = 000100
PR3     = 000140
PR4     = 000200
PR5     = 000240
PR6     = 000300
PR7     = 000340
PS      = 177776
PSW     = 177776
PWRMSG  040676
PWRVEC= 000024
RDCHR = 104411
RDLIN = 104412
RESREG= 104414
RESTRT  020472
RESVEC= 000010
R6      =%000006
R7      =%000007
SAVREG= 104413
SETREG  035202
SR0     = 177572
SR1     = 177574
SR2     = 177576
SR3     = 172516
STACK = 001100
START   020000
STKLMT= 177774
SWR     001140
SWREG   000176
SW0     = 000001
SW00    = 000001
SW01    = 000002
SW02    = 000004
SW03    = 000010
SW04    = 000020
SW05    = 000040
SW06    = 000100
SW07    = 000200
SW08    = 000400
SW09    = 001000
SW1     = 000002
SW10    = 002000
SW11    = 004000
SW12    = 010000
SW13    = 020000
SW14    = 040000
SW15    = 100000
SW2     = 000004
SW3     = 000010
SW4     = 000020
SW5     = 000040
SW6     = 000100
SW7     = 000200
SW8     = 000400
SW9     = 001000
TBIT    = 000020
TBITPS  001276
TBITVE= 000014
TESTNO  001262
TIMEON  020472
TIMERR  002076
TIMFLG  002100
TIMOFF  033636
TKVEC   = 000060
TOFF    035114
TON     035150
TONUM   001304
TPVEC   = 000064
TRAPPC  001266
TRAPPS  001270
TRAPVE= 000034
TRTVEC= 000014
TST1    020576
TST10   021546
TST11   021700
TST12   022032
TST13   022174
TST14   022232
TST15   022302
TST16   022420
TST17   022542
TST2    020650
TST20   022672
TST21   023022
TST22   023226
TST23   023376
TST24   024126
TST25   024516
TST26   025234
TST27   025430
TST3    020734
TST30   025636
TST31   026004
TST32   026300
TST33   026510
TST34   027072
TST35   027440
TST36   027632
TST37   030234
TST4    021056
TST40   030422
TST41   030504
TST42   030654
TST43   031176
TST44   032044
TST45   032724
TST46   033470
TST47   033574
TST5    021124
TST6    021262
TST7    021414
TYPBN   = 104406
TYPDS   = 104405
TYPE    = 104401
TYPOC   = 104402
TYPON   = 104404
TYPOS   = 104403
UIPAR0= 177640
UIPAR1= 177642
UIPAR2= 177644
UIPAR3= 177646
UIPAR4= 177650
UIPAR5= 177652
UIPAR6= 177654
UIPAR7= 177656
UIPDR0= 177600
UIPDR1= 177602
UIPDR2= 177604
UIPDR3= 177606
UIPDR4= 177610
UIPDR5= 177612
UIPDR6= 177614
UIPDR7= 177616
USESTK= 000700
USP     =%000006
VIRT1   001306
VIRT2   001310
WASR6   001264
WASSR0  001272
WASSR2  001274
WBIT    = 000100
$APTHD  000204
$ATYC   037240
$ATY1   037214
$ATY3   037222
$ATY4   037232
$AUTOB  001134
$BDADR  001122
$BDDAT  001126
$BELL   001216
$BIN    037534
$CHARC  037210
$CKSWR  035610
$CLR.T  034062
$CMTAG  001100
$CM1    = 000006
$CM2    = 000014
$CM3    = 000006
$CM4    = 000006
$CNTLC  036540
$CNTLG  036552
$CNTLU  036545
$CPUOP  001254
$CRLF   001223
$DBLK   040200
$DB2O   040304
$DEVCT  001236
$DOAGN  034102
$DTBL   040170
$ENDAD  034072
$ENDCT  033714
$ENULL  034146
$ENV    001246
$ENVM   001247
$EOP    033660
$EOPCT  033706
$ERFLG  001103
$ERMAX  001115
$ERROR  034432
$ERRPC  001116
$ERRTB  001316
$ERTTL  001112
$ESCAP  001214
$ETABL  001246
$ETEND  001262
$FATAL  001230
$FFLG   037460
$FILLC  001156
$FILLS  001155
$GDADR  001120
$GDDAT  001124
$GET42  034044
$GTSWR  035660
$HD     = 000000
$HIBTS  000204
$ICNT   001104
$ILLUP  040670
$INTAG  001135
$ITEMB  001114
$LF     001224
$LFLG   037457
$LOOP   034140
$LPADR  001106
$LPERR  001110
$MADR1  001260
$MAIL   001226
$MAMS1  001256
$MBADR  000206
$MFLG   037456
$MNEW   036570
$MSGAD  001242
$MSGLG  001244
$MSGTY  001226
$MSWR   036557
$MTYP1  001257
$MXCNT  034430
$NULL   001154
$NWTST= 000001
$OCNT   037760
$OCTVL  040406
$OMODE  037762
$OVER   034414
$PASS   001234
$PASTM  000212
$PWRAD  040652
$PWRDN  040512
$PWRMG  040646
$PWRUP  040564
$QUES   001222
$RDCHR  036132
$RDLIN  036252
$RDSZ   = 000010
$REGAD  001160
$REG0   001162
$REG1   001164
$REG2   001166
$REG3   001170
$REG4   001172
$REG5   001174
$RESRE  040246
$RTNAD  034142
$RTRN   034136
$SAVRE  040210
$SAVR6  040674
$SCOPE  034152
$SETUP= 000137
$STUP   = 177777
$SVLAD  034360
$SVPC   = 000204
$SWR    = 177400
$SWREG  001250
$SWRMK= 000000
$TBIT   034144
$TESTN  001232
$TIMES  001212
$TKB    001146
$TKS    001144
$TMP0   001176
$TMP1   001200
$TMP2   001202
$TMP3   001204
$TMP4   001206
$TMP5   001210
$TN     = 000050
$TPB    001152
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$TPFLG  001157          $TRPAD  040460          $TYPDS  037764          $TYPON  037576          $XTSTR  034164
$TPS    001150          $TSTM   000210          $TYPE   036732          $TYPOS  037536          $OFILL  037761
$TRAP   040424          $TSTNM  001102          $TYPEC  037144          $UNIT   001240          .       = 050213
$TRAP2  040446          $TTYIN  036530          $TYPEX  037212          $UNITM  000214          .$X     = 000204
$TRP  = 000015          $TYPBN  037462          $TYPOC  037562          $USWR   001252

. ABS.  050213     000


 ERRORS DETECTED:  0

 MULE:CJKDAB,MULE:CJKDAB.SEQ/SOL/NL:TOC=CJKDAB.P11
 RUN-TIME: 102 58 1 SECONDS
 RUN-TIME RATIO: 527/162=3.2
 CORE USED:  32K  (63 PAGES)
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