KD11-K

PDP11/60 MEMORY MANAGEMENT AH-8108B-MC

CQKTAB0

FICHE 1 OF 1

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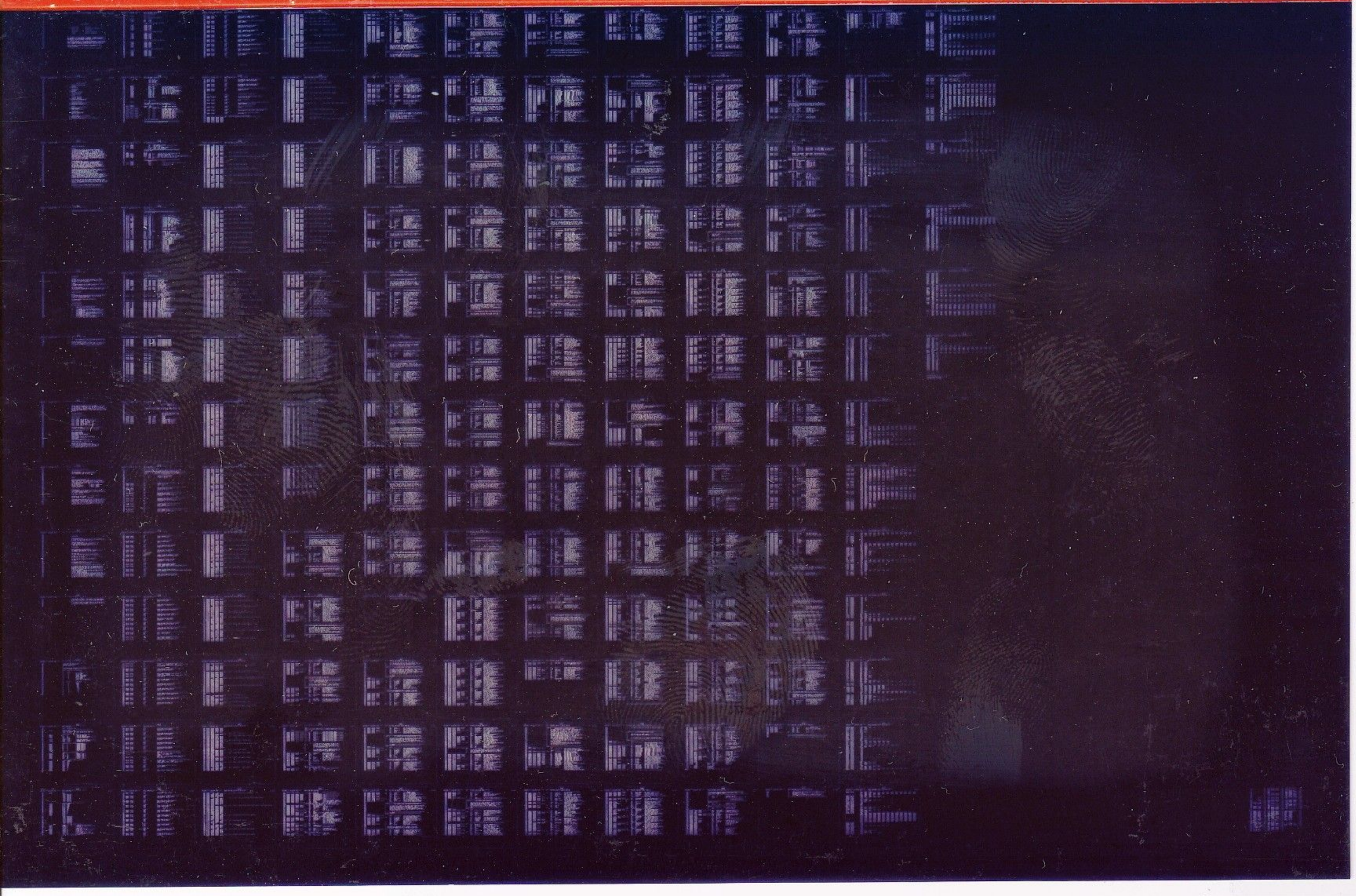
digital

MADE IN USA



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.REM a
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IDENTIFICATION

PRODUCT CODE:	AC-8106B-MC
PRODUCT NAME:	CQKTABO PDP11/60 MEM MNGMNT
DATE CREATED:	JANUARY,1978
MAINTAINER:	DIAGNOSTIC ENGINEERING
AUTHOR:	DIAGNOSTIC ENGINEERING

TABLE OF CONTENTS

1. ABSTRACT AND DESCRIPTION

1.1 ABSTRACT

THIS PROGRAM WILL TEST ALL OF THE MEMORY MANAGEMENT LOGIC, INCLUDING THE STACK LIMIT REGISTER LOGIC, AND ENABLE THE FIELD SERVICE REPRESENTATIVE TO ISOLATE THE DETECTED FAILURES TO A REPLACABLE MODULE. IT IS ASSUMED THAT THE CPU HAS BEEN TESTED, OR IS KNOWN TO BE FUNCTIONING CORRECTLY, AND THAT THE PROGRAM IS STARTED FROM ADDRESS 200. THE 11/6X SERIES CACHE IS TURNED OFF FOR THE FIRST PASS OF THE PROGRAM (SEE SECTION 4.3) AND IS TURNED BACK ON FOR THE SECOND AND SUBSEQUENT PASSES. THIS WILL PROVIDE THE EARLIEST DETECTION OF MEMORY MANAGEMENT RELATED ERRORS AND ENABLE LOOPING ON THE ERROR INVOLVING MINIMUM LOGIC. THIS PROGRAM MAY ALSO EXPOSE FAULTS THAT ARE ON THE INTERFACE BETWEEN MEMORY MANAGEMENT AND OTHER SECTIONS OF THE COMPUTER.

1.2 PROGRAM DESCRIPTION

THIS PROGRAM HAS BEEN SEGMENTED IN THE FOLLOWING WAY:
ALL DATA TABLES, ERROR MESSAGES, AND TRAP HANDLERS RESIDE IN LOW CORE (VIRTUAL PAGES 0 IE. ADDRESSES 000000 THRU 017776). RIGHT NOW THE END OF THE TRAP HANDLERS IS AROUND 015500, SO THERE IS SOME ROOM FOR FUTURE EXPANSION. THE TEST CODE STARTS AT VIRTUAL PAGE 1 (ADDRESS 020000) AND EXPANDS TOWARD PAGE 3 (ADDRESS 060000). THE END OF THE PROGRAM IS NOW AROUND ADDRESS 044300, SO MODIFICATIONS CAN BE MADE WITHOUT RE-SEGMENTING THE PROGRAM.

THE REASON FOR THIS SEGMENTATION IS TWO-FOLD, FIRST IT ENABLES THE OPERATOR TO TELL FROM THE ADDRESS DISPLAYED EXACTLY WHERE THE PROGRAM HAS HALTED OR "HUNG-UP". THAT IS, DID IT HALT IN THE TRAP ROUTINE BECAUSE OF A CONDITION IMPOSSIBLE TO RECOVER FROM (ON PAGE 0), OR DID IT GET "HUNG-UP" IN THE TEST CODE ON PAGE 1 OR 2.
THE OTHER REASON IS THAT CERTAIN MEMORY MANAGEMENT FUNCTIONS LOCK UP THE VIRTUAL PC OF THE INSTRUCTION AND THE PROGRAM, IN ORDER TO OPERATE PROPERLY, ONE MUST KNOW WHERE IT IS AT ALL TIMES. IT SEEMS MUCH SIMPLER FOR THE CODE TO START AT A PREDETERMINED BOUNDARY SO THAT IF THE MESSAGES CHANGE OR A NEW SUBROUTINE IS ADDED THE PAGE THAT THE CODE IS ON WILL REMAIN THE SAME.

EACH TEST WILL SET THE LOOP ON ERROR POINTER ($LPERR) TO THE MINIMUM NECESSARY SETUP CODE, IF ANY, FOR THE FUNCTION UNDER TEST. IF ON THE 11/6X AN "EXTERNAL SYNC PULSE" ON THE BACK PLANE IS DESIRED, THE MICROBREAK REGISTER SHOULD BE LOADED FROM THE CONSOLE WITH A MICRO-ADDRESS USED IN THE INSTRUCTION THAT TESTS EACH NEW FUNCTION.

SECTION 8.4 OF THIS DOCUMENT CONTAINS SOME IDEAS ON HOW TO EFFECTIVELY UTILIZE IT TO MAKE FAULT ISOLATION EASIER.

IT SHOULD BE NOTED THAT THIS PROGRAM DOES NOT CHECK OUT THE

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151                                   CONSOLE OR THE CONSOLE CABLES.  THE PROGRAM ASSUMES THAT
152                                   THOSE COMPONENTS HAVE BEEN TESTED OR ARE KNOWN TO BE GOOD.
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2. REQUIREMENTS

2.1 EQUIPMENT

THE BASIC PDP-11/40 (WITH MEMORY MANAGEMENT-KT11-D) OR A PDP-11/6X SERIES COMPUTER, INCLUDING AN OPERATING CPU AND MEMORY. A CONSOLE TERMINAL IS ALSO NEEDED FOR ERROR MESSAGES, AND END OF PASS REPORTS.

2.2 STORAGE

THIS PROGRAM REQUIRES 12K OF MEMORY TO LOAD AND AT LEAST 16K OF MEMORY TO RUN IN. IT WILL SCAN MEMORY FROM 12K TO 124K ON 2K BOUNDARIES, REPORTING ANY HOLES IT MAY FIND.

2.3 PRELIMINARY PROGRAMS

THE CPU DIAGNOSTICS SHOULD BE RUN BEFORE THIS PROGRAM. MAIN MEMORY SHOULD BE SCANNED FOR AT LEAST THE FIRST 16K TO SEE THAT A PROGRAM WILL EXECUTE CORRECTLY BEFORE ANY PROGRAM IS RUN.

3. LOADING PROCEDURE

3.1 METHOD

THIS PROGRAM CAN BE LOADED FROM ANY DEVICE THAT IS SUPPORTED BY XXDP, AND SHOULD BE LOADED USING THE XXDP PROCEDURE FOR THAT DEVICE OR IT CAN BE LOADED DIRECTLY USING THE ABSOLUTE LOADER AND THE BINARY PAPER TAPE.

IF LOADING A BINARY PAPER TAPE, BE SURE THE SWITCH REGISTER IS CLEARED AFTER THE ABSOLUTE LOADER IS LOADED.

4. STARTING PROCEDURE

4.1 STARTING ADDRESSES

NOTE: CHECK THAT SWITCH REGISTER WAS ZERO IF PROGRAM WAS LOADED FROM PAPER TAPE.

200	THIS ADDRESS WILL RUN THE COMPLETE PROGRAM
204	THIS ADDRESS WILL START THE PROGRAM AT ENTRY POINT 2 TEST THE READ/WRITE BITS IN THE MEMORY MANAGEMENT STATUS REGISTERS
210	THIS ADDRESS WILL START THE PROGRAM AT ENTRY POINT 3 PAGE ADDRESS AND PAGE DESCRIPTOR REGISTER TESTS
214	THIS ADDRESS WILL START THE PROGRAM AT ENTRY POINT 4 RELOCATION AND ADDER TESTS
220	THIS ADDRESS WILL START THE PROGRAM AT ENTRY POINT 5 MEMORY MANAGEMENT ABORTS LOGIC TESTS
224	THIS ADDRESS WILL START THE PROGRAM AT ENTRY POINT 6 W BIT LOGIC TEST AND DUAL MAPPING TESTS

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                        230     THIS ADDRESS WILL START THE PROGRAM AT ENTRY POINT 7
                                MOVE FROM AND MOVE TO PERVIOUS MODE INSTRUCTION TESTS

                    4.2     PROGRAM AND OPERATOR ACTION
                            AFTER THE PROGRAM IS LOADED, THE FIRST TIME IT IS RUN IT WILL
                            IDENTIFY ITSELF AND RUN A QUICK VERIFY PASS.  AT THE END OF
                            EACh PASS THE PROGRAM WILL TYPE OUT THE PASS NUMBER AND THE
                            TOTAL NUMBER OF ERRORS FOUND ON THAT PASS, AS FOLLOWS:

                            "END PASS #     1    TOTAL ERRORS SINCE LAST REPORT     0"
```

4.3 SPECIAL STARTING PROCEDURE ON THE 11/6X SERIES
FOR THE FIRST TIME THROUGH THE TESTS THE CACHE WILL BE TURNED OFF (BITS 2 & 3 - FORCE MISS 0 & 1 - ARE SET IN THE CACHE CONTROL REGISTER.). CACHE IS TURNED ON AFTER THE FIRST PASS AND LEFT ON FOR THE REMAINING PASSES (BITS 2 & 3 OF THE CONTROL REGISTER ARE CLEARED AND BIT 7 - PARITY ERROR ABORT BIT - IS SET ENABLING CACHE PARITY ERRORS TO BE REPORTED IN THE MEMORY ERROR REGISTER.)

5. OPERATING PROCEDURE

5.1 OPERATIONAL SWITCH SETTINGS

SWITCH	DISPLAY	
SW15=1	100000	HALT ON ERROR
SW14=1	040000	LOOP ON THE TEST THAT YOU ARE IN
SW13=1	020000	INHIBIT ALL ERROR TYPE OUTS
SW12=1	010000	INHIBIT TRACE TRAP
SW11=1	004000	INHIBIT ITERATIONS AFTER FIRST PASS
SW10=1	002000	RING BELL ON ERROR
SW09=1	001000	LOOP ON ERROR
SW08=1	000400	LOOP ON TEST IN SWR<06:00>
SW07=1	000200	INHIBIT MULTIPLE ERROR TYPE OUTS

5.2 SUBROUTINE ABSTRACTS
ALL SUBROUTINE ABSTRACTS APPEAR IN THE CODE, BEFORE THEIR EXPANSION, THE FOLLOWING IS A LIST OF THEIR TITLES.

5.2.1 MACRO LIBRARY SUBROUTINES (FOUND IN MOST PROGRAMS)

END OF PASS ROUTINE
SCOPE HANDLER ROUTINE
ERROR HANDLER ROUTINE
ERROR MESSAGE TYPE OUT ROUTINE
SAVE & RESTORE R0-R5 ROUTINES
TYPE ROUTINE
BINARY TO OCTAL (ASCII) AND TYPE ROUTINE
CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
TRAP DECODER
POWER DOWN AND UP ROUTINE
DOUBLE LENGTH BINARY TO OCTAL ASCII CONVERT ROUTINE

5.2.2 SUBROUTINES UNIQUE TO THIS PROGRAM

TURN OFF AND SAVE THE T-BIT
RESTORE T-BIT TO ITS PREVIOUS CONDITION
CLEAR 8 PAR'S OR PDR'S STARTING FROM ADDRESS IN R5
CLEANUP LOCATIONS THAT HOLD LOGICAL 'AND' AND 'OR'
P.A.R. OR P.D.R. ADDRESS TIMED OUT WHEN REFERENCED
DUAL ADDRESSING WHEN LOADING A P.A.R. OR P.D.R.
COUNT PATTERN ERROR IN P.A.R.'S OR P.D.R.'S

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5.2.3 TRAP AND ABORT HANDLER ROUTINES

CPU TRAP HANDLER
CACHE/MEMORY-PARITY TRAPS AND ABORTS HANDLER
MEMORY MANAGEMENT TRAPS AND ABORTS HANDLER
TRAF ROUTINES FOR ABORT IN USER MODE

6. ERRORS

6.1 ERROR HALTS AND DESCRIPTION

WHEN THE PROGRAM DETECTS AN ERROR CONDITION IT ISSUES AN "ERROR" (EMT) CALL. THIS CAUSES THE CPU TO TRAP TO THE "ERROR HANDLER ROUTINE" WHICH PRINTS OUT THE ERROR MESSAGE, IF ANY, AND CHECKS THE SWITCH REGISTER FOR THE MODE SELECTED. THE PROGRAM WILL REACT AS FOLLOWS:

HALT ON THE ERROR	IF SW15=1, (100000)
INHIBIT ERROR TYPE OUT	IF SW13=1, (020000)
RING BELL ON THE ERROR	IF SW10=1, (002000)
LOOP ON THE ERROR	IF SW09=1, (001000)
INHIBIT MULTIPLE TYPE OUTS	IF SW07=1, (000200)

6.2 ERROR RECOVERY

IF SWITCH 09 IS UP, THE PROGRAM WILL LOOP BACK TO WHERE THE LOOP ON ERROR POINTER ($LPERR) IS SET. THIS WILL PROVIDE THE TIGHTEST POSSIBLE SCOPING LOOP, AND PROVIDES ALL NECESSARY SETUP CODE TO RECREATE THE ERROR.

6.3 SAMPLE ERROR TYPE OUTS

```
UNEXPECTED CPU TRAP OR ABORT THRU "ERRVEC" (004)
CPU ERR TESTNO PC AT ABORT
000020  000033   XXXXXX
```

THIS ERROR MESSAGE INDICATES THAT THE CPU TIMED OUT OVER THE UNIBUS WHEN NO TIMEOUTS WERE EXPECTED. THE CONTENTS OF THE CPU ERROR REGISTER, IF ON AN 11/6X, ARE SHOWN UNDER "CPU ERR", SHOWING THAT IN FACT A UNIBUS TIMEOUT DID OCCUR (BIT 4 IS SET). IF ON AN 11/40, JUST THE TEST NO. AND PC AT THE TIME OF THE ABORT ARE TYPED OUT. THIS TEST HAPPENS TO BE CHECKING THE CARRY PROPAGATION, THAT IS DETERMINED FROM LOOKING AT THE INDEX AT THE FRONT OF THE LISTING.

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321
322
323                 7.      RESTRICTIONS
324                         ------------
325
326                 7.1     STARTING RESTRICTIONS
327                         IF A STARTING POINT OTHER THAN "200" IS USED AND ERRORS ARE
328                         REPORTED, THEY MAY BE DUE TO LOGIC THAT IS ASSUMED TO BE WORKING
329                         AS A RESULT OF TESTS THAT WERE NOT RUN.
330
331                 7.2     OPERATING RESTRICTIONS
332                         THE "MED" INSTRUCTION IS USED TO DETERMINE IF THE
333                         PROGRAM IS EXECUTING ON AN 11/40 OR AN 11/6X.  IF
334                         A "MED" TRAPS AS A RESERVED INSTRUCTION, IT IS
335                         AUTOMATICALLY ASSUMED THE PROGRAM IS ON AN 11/40.
336
337                 8.      MISCELLANEOUS
338                         -------------
339
340                 8.1     MEMORY MANAGEMENT STATUS REGISTERS
341                         THE SYMBOLS "MMR0,MMR1,MMR2" ARE USE THROUGHOUT
342                         THE PROGRAM. THESE REPRESENT THE THREE MEMORY MANAGEMENT
343                         STATUS REGISTERS IN THE 11/6X OR THE 11/40.
344
345                 8.2     EXECUTION TIME
346                         THE TIMES NOTED BELOW ARE "11/6X" TIMES. PROGRAM
347                         EXECUTION TIMES WILL BE LONGER IN EXECUTING ON AN 11/40.
348
349                         THE RUN TIME FOR A SINGLE PASS WITH NO ITERATIONS IS
350                         APPROXIMATELY 10 SECONDS.
351
352                         THE RUN TIME FOR A SINGLE PASS WITH ITERATIONS
353                         AND TRACE TRAPPING ENABLED IS APPROXIMATELY
354                         3 MINUTES.
355
356                 8.3     ACT/APT/XXDP COMPATABILITY
357                         THE PROGRAM IS FULLY ACT AND APT COMPATABLE AND
358                         IS SUPPORTED UNDER THE XXDP PACKAGE.
359
360                 8.4     HINTS ON HOW TO GET MORE INFORMATION FROM THE PROGRAM
361
362                         IF AN ERROR OCCURS THE FIRST THING THAT SHOULD BE NOTED IS
363                         WHAT PASS DID THE ERROR OCCUR ON.  IF THE PASS HAS AN ODD
364                         NUMBER AND SWITCH 12 IS DOWN THEN THE ERROR MIGHT BE T-BIT
365                         SENSITIVE.  TRY TO RUN AGAIN WITH SWITCH 12 UP, THIS WILL
366                         INHIBIT T-BIT TRAPPING.
367                         IF THE PASS NUMBER IS GREATER THAN ONE THE ERROR MIGHT BE
368                         ITERATION SENSITIVE.  TRY TO RUN AGAIN WITH SWITCH 11 UP,
369                         THIS WILL INHIBIT ITERATIONS.
370                         NOW THAT YOU HAVE DETERMINED HOW TO MAKE THE MACHINE FAIL
371                         LOCK IN THE INDEX AT THE FRONT OF THE LISTING TO FIND THE TITLE
372                         OF THE TEST THAT WAS RUNNING WHEN THE ERROR CONDITION OCCURRED.
373                         GO TO THE LISTING AND READ THE PARAGRAPH AT THE BEGINNING OF
374                         THE TEST SO THAT YOU KNOW WHAT THE TEST IS TRYING TO DO.
375                         NOW READ THE ERROR MESSAGE AND IF THERE IS A COLUMN LABELED
376                         "ERRORPC" GO TO THAT LOCATION IN THE TEST.  THIS IS THE PC
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                        OF THE "ERROR" STATEMENT.  THE NUMBER IS THE ERROR MESSAGE
                        NUMBER AND IN THE FRONT OF THE LISTING IS THE "ERROR MESSAGE
                        POINTER TABLE" WHICH WILL TELL YOU WHAT WORDS WERE TYPED
                        OUT.
                        IF YOU WANT TO SCOPE THIS ERROR CONDITION, PUT UP SWITCH 09
                        (LOOP ON ERROR) OR IF YOU WANT TO LOOP ON THE ENTIRE TEST PUT
                        UP SWITCH 14.  YOU WILL PROBABLY WANT TO INHIBIT THE ERROR TYPE
                        OUT AT THIS POINT, SWITCH 13 WILL DO THAT.
```

```
                        .TITLE  CQKTA-BO  PDP 11/6X MEM. MGMT. DIAG.
                        ;*COPYRIGHT (C) JANUARY,1978
                        ;*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<6:0>
                        ;*         7            INHIBIT MULTIPLE ERROR TYPEOUTS
                        ;*
                        ;*      SWITCH          OCTAL VALUE
                        ;*      ------          ------------
                        ;*        15            100000
                        ;*        14             40000
                        ;*        13             20000
                        ;*        12             10000
                        ;*        11              4000
                        ;*        10              2000
                        ;*         9              1000
                        ;*         8               400
                        ;*         7               200
                        ;*         6               100
                        ;*         5                40
                        ;*         4                20
                        ;*         3                10
                        ;*         2                 4
                        ;*         1                 2
                        ;*         0                 1
```

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                        .SBTTL  BASIC DEFINITIONS

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

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

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

                        ;*PRIORITY LEVEL DEFINITIONS
000000                  PR0=    0               ;;PRIORITY LEVEL 0
000040                  PR1=    40              ;;PRIORITY LEVEL 1
000100                  PR2=    100             ;;PRIORITY LEVEL 2
000140                  PR3=    140             ;;PRIORITY LEVEL 3
000200                  PR4=    200             ;;PRIORITY LEVEL 4
000240                  PR5=    240             ;;PRIORITY LEVEL 5
000300                  PR6=    300             ;;PRIORITY LEVEL 6
000340                  PR7=    340             ;;PRIORITY LEVEL 7

                        ;*"SWITCH REGISTER" SWITCH DEFINITIONS
100000                  SW15=   100000
040000                  SW14=   40000
020000                  SW13=   20000
010000                  SW12=   10000
004000                  SW11=   4000
002000                  SW10=   2000
001000                  SW09=   1000
000400                  SW08=   400
000200                  SW07=   200
000100                  SW06=   100
000040                  SW05=   40
000020                  SW04=   20
000010                  SW03=   10
000004                  SW02=   4
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                        SW01=   2
                        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
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                        ;*KT11 VECTOR ADDRESS

000250                  MMVEC=  250

                        ;*KT11 STATUS REGISTER ADDRESSES

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

                        ;*USER "I" PAGE DESCRIPTOR REGISTERS

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

                        ;*USER "I" PAGE ADDRESS REGISTERS

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

                        ;*KERNEL "I" PAGE DESCRIPTOR REGISTERS

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

                        ;*KERNEL "I" PAGE ADDRESS REGISTERS

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

                                .EQUIV SP,KSP
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                                        .EQUIV SP,USP
                                        .EQUIV STACK,KERSTK
                                        .EQUIV SR0,MMR0
                                        .EQUIV SR1,MMR1
                                        .EQUIV SR2,MMR2
                                        ;
                                        ;ADDITIONAL DEFINITIONS
                                        ;
000700                                  USESTK=STACK-200
000200                                  CRLF=   200             ;CODE FOR CARRIAGE RETURN LINE FEED
000114                                  CACHVEC=114             ;CACHE ERROR INTERRUPT VECTOR
076600                                  MED=    76600           ;OP CODE OF MAINTENANCE EXAM/DEP INST.
000022                                  RWHAM=  022             ;READ CODE FOR WHAMI REG.
000100                                  RLJAM=  100             ;READ CODE FOR LOG JAM REGISTER
000101                                  RLSERV= 101             ;READ CODE FOR LOG SERVICE REGISTER
000104                                  RLFGIN= 104             ;READ CODE FOR LOG FLAG/INTERRUPT REG.
000105                                  RLWHAM= 105             ;READ CODE FOR LOG WHAMI REGISTER
000222                                  WWHAM=  222             ;WRITE CODE FOR WHAMI REG.
000226                                  WCNSSW= 226             ;WRITE CODE FOR CONSOLE SW. REG.
000305                                  WLWHAM= 305             ;WRITE CODE FOR LOG WHAMI REGISTER
000300                                  WLJAM= 300
000301                                  WLSERV= 301
000304                                  WLFGIN= 304
177766                                  CPUERR=177766           ;XXXXXXX


                                .SBTTL  TRAP CATCHER

000000                                  .=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
000174                                  .=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     @#STRT1 ;;JUMP TO STARTING ADDRESS OF PROGRAM
                                                                ;RUN ENTIRE PROGRAM (ALL TESTS)
000204  000137  020010                  JMP     STRT2           ;STARTING AT ENTRY POINT 2
                                                                ;MEMORY MANAGEMENT STATUS REGISTERS
000210  000137  020020                  JMP     STRT3           ;STARTING AT ENTRY POINT 3
                                                                ;PAGE ADDRESS AND DESCRIPTOR REGISTERS
000214  000137  020030                  JMP     STRT4           ;STARTING AT ENTRY POINT 4
                                                                ;RELOCATION AND ADDER TESTS
000220  000137  020040                  JMP     STRT5           ;STARTING AT ENTRY POINT 5
                                                                ;MEMORY MANAGEMENT ABORT LOGIC
000224  000137  020050                  JMP     STRT6           ;STARTING AT ENTRY POINT 6
                                                                ;W BIT LOGIC & DUAL MAPPING
000230  000137  020060                  JMP     STRT7           ;STARTING AT ENTRY POINT 7
                                                                ;MFP & MTP LOGIC TESTS
                                .SBTTL  APT PARAMETER BLOCK

                                ;;*****************************************************************
                                ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                ;;*****************************************************************
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                     000234                 .$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               000234                 $APTHDR  ;;POINT TO APT HEADER BLOCK
                     000234                 .=.$X    ;;RESET LOCATION COUNTER
                                        ;;**************************************************************
                                        ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                        ;INTERFACE SPEC.

000234                                  $APTHD:
000234  000000                          $HIBTS: .WORD   0        ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
000236  001226                          $MBADR: .WORD   $MAIL    ;;ADDRESS OF APT MAILBOX (BITS 0-15)
000240  000005                          $TSTM:  .WORD   5        ;;RUN TIM OF LONGEST TEST
000242  000015                          $PASTM: .WORD   15       ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
000244  000005                          $UNITM: .WORD   5        ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
000246  000052                                  .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
                                        .SBTTL  ACT11 HOOKS


                                        ;;**************************************************************
                                        ;HOOKS REQUIRED BY ACT11
                     000250                         $SVPC=.                 ;SAVE PC
                     000046                         .=46
000046               041034                         $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
                     000052                         .=52
000052               000000                         .WORD   0               ;;2)SET LOC.52 TO ZERO
                     000250                         .=$SVPC                 ;; RESTORE PC
```

```
                                .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  000                     $MAMS2: .BYTE   AMAMS2   ;;HIGH ADDRESS,M.S. BYTE
001263  000                     $MTYP2: .BYTE   AMTYP2   ;;MEM.TYPE,BLK#2
001264  000000                  $MADR2: .WORD   AMADR2   ;;MEM.LAST ADDRESS,BLK#2
001266  000                     $MAMS3: .BYTE   AMAMS3   ;;HIGH ADDRESS,M.S.BYTE
001267  000                     $MTYP3: .BYTE   AMTYP3   ;;MEM.TYPE,BLK#3
001270  000000                  $MADR3: .WORD   AMADR3   ;;MEM.LAST ADDRESS,BLK#3
001272  000                     $MAMS4: .BYTE   AMAMS4   ;;HIGH ADDRESS,M.S.BYTE
001273  000                     $MTYP4: .BYTE   AMTYP4   ;;MEM.TYPE,BLK#4
001274  000000                  $MADR4: .WORD   AMADR4   ;;MEM.LAST ADDRESS,BLK#4
001276  000000                  $VECT1: .WORD   AVECT1   ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
001300  000000                  $VECT2: .WORD   AVECT2   ;;INTERRUPT VECTOR#2BUS PRIORITY#2
001302  000000                  $BASE:  .WORD   ABASE    ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
001304  000000                  $DEVM:  .WORD   ADEVM    ;;DEVICE MAP
001306  000000                  $CDW1:  .WORD   ACDW1    ;;CONTROLLER DESCRIPTION WORD#1
001310  000000                  $CDW2:  .WORD   ACDW2    ;;CONTROLLER DESCRIPTION WORD#2
001312  000000                  $DDW0:  .WORD   ADDW0    ;;DEVICE DESCRIPTOR WORD#0
001314  000000                  $DDW1:  .WORD   ADDW1    ;;DEVICE DESCRIPTOR WORD#1
001316  000000                  $DDW2:  .WORD   ADDW2    ;;DEVICE DESCRIPTOR WORD#2
001320  000000                  $DDW3:  .WORD   ADDW3    ;;DEVICE DESCRIPTOR WORD#3
001322  000000                  $DDW4:  .WORD   ADDW4    ;;DEVICE DESCRIPTOR WORD#4
001324  000000                  $DDW5:  .WORD   ADDW5    ;;DEVICE DESCRIPTOR WORD#5
```

```
792  001326  000000                $DDW6:  .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
793  001330  000000                $DDW7:  .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
794  001332  000000                $DDW8:  .WORD   ADDW8   ;;DEVICE DESCRIPTOR WORD#8
795  001334  000000                $DDW9:  .WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
796  001336  000000                $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
797  001340  000000                $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
798  001342  000000                $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
799  001344  000000                $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
800  001346  000000                $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
801  001350  000000                $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15
802
803
804  001352                        $ETEND:
805
806
807  001352  177746                CONTRL: .WORD   177746          ;CACHE CONTROL REGISTER
808                                                               ;CONDITION THAT CAUSED THE TRAP
809                                                               ;TO ERRVEC(000004)
810  001354  177752                HITMIS: .WORD   177752          ;HIT MISS REGISTER "1"
811                                                               ;IMPLIES HIT IN CACHE
812  001356  177744                MEMERR: .WORD   177744          ;CACHE ERROR REGISTER
813  001360  000000                FSTTST: .WORD   0               ;HOLDS THE INDEX TO
814                                                               ;THE STARTING ADDRESS TABLE
815  001362  000000                CPUEXP: .WORD   0               ;HOLDS EXPECTED CPU ERROR CONDITION
816  001364  000000                MMEXP:  .WORD                   ;HOLDS EXPECTED MEMORY MANAGEMENT ABORT CONDITION
817  001366  000000                STKEXP: .WORD   0               ;HOLDS TYPE OF STACK VIOLATION EXPECTED
818  001370  000000                PADRSL: .WORD   0               ;HOLDS THE LOWER 16 BITS OF A 18-BIT
819                                                               ;ADDRESS GENERATED FOR TYPE OUT
820  001372  000000                PADRSH: .WORD   0               ;HOLDS THE UPPER 6 BITS OF A 18-BIT
821                                                               ;ADDRESS GENERATED FOR TYPE OUT
822  001374  000000                PPARER: .WORD   0               ;HOLDS PARITY ERROR REG
823  001376  000000                PCONTR: .WORD   0               ;HOLDS CACHE CONTROL REG
824  001400  000000                PHITMI: .WORD   0               ;HOLDS CACHE HIT MISS REG
825  001402  000000                PMMR0:  .WORD   0               ;HOLDS MEMORY MANAGEMENT REGISTER 0
826  001404  000000                PMMR2:  .WORD   0               ;HOLDS MEMORY MANAGEMENT REGISTER 2
827  001406  000000                PCPUER: .WORD   0               ;HOLDS CPU ERROR REGISTER.
828  001410  000000                BADPC:  .WORD   0               ;HOLDS PC AT ABORT OR TRAP TIME.
829  001412  000000                TESTNO: .WORD   0               ;HOLDS TEST NUMBER OF LAST ERROR.
830  001414  000000                DATAOR: .WORD   0               ;HOLDS LOGICAL OR OF BAD DATA
831  001416  000000                DATAND: .WORD   0               ;HOLDS LOGICAL AND OF BAD DATA
832  001420  000000                PATTOR: .WORD   0               ;HOLDS LOGICAL OR OF PATTERN LOADED
833  001422  000000                PATAND: .WORD   0               ;HOLDS LOGICAL AND OF PATTERN LOADED
834  001424  000000                ADDROR: .WORD   0               ;HOLDS LOGICAL OR OF ADDRESS
835  001426  000000                ADRAND: .WORD   0               ;HOLDS LOGICAL AND OF ADDRESS
836  001430  000000                ERRCNT: .WORD   0               ;HOLDS NUMBER OF ERRORS ON TEST
837  001432  000000                HOLFLG: .WORD   0               ;HOLDS NUMBER OF CONSECUTIVE TIME OUTS
838                                                               ;OCCURRING IN A HOLE IN MEMORY
839  001434  000000                OLDPC:  .WORD   0               ;HOLDS THE RETURN ADDRESS
840                                                               ;IN CASE OF A LOOP ON ERROR
841  001436  000000                OLDPS:  .WORD   0               ;HOLDS THE OLD PROCESSOR STATUS
842                                                               ;IN CASE OF A LOOP ON ERROR
843  001440  000340                OLDPSW: .WORD   000340          ;HOLDS OLD PSW SO THAT THE T-BIT
844                                                               ;CAN BE RESTORED PROPERLY
845  001442  000000                RETRY:  .WORD   0               ;FLAG TO DECIDE IF ONE PARITY HAS
846                                                               ;HAS BEEN ATTEMPTED
847  001444  000000                NXTTST: .WORD   0               ;HOLDS ADDRESS OF THE NEXT TEST
```

```
000446      000                 FORTY:  .BYTE   0               ;PROCESSOR INDICATOR
                                                                ;IF = 0   RUNNING ON AN 11/6X
                                                                ;IF = 1   RUNNING ON AN 11/40
                    001450              .EVEN

                                ;;  THIS AREA STAPTS THE DATA TABLE WHERE ANY TABLE REFERENCE WILL
                                ;;  REFER TO.  ALL DATA WORDS WILL BE LOADED HERE IN ONE SPOT SO THAT
                                ;;  IT WILL BE EASIER FOR YOU TO FIND OUT WHAT THAT WORD IS.


001450                          PARTAB:                         ;THIS IS THE TABLE OF THE FIRST
                                                                ;PAR OR PDR OF EACH GROUP.  THEY
                                                                ;WILL BE USED FOR A DUAL ADDRESSING
                                                                ;TEST BETWEEN GROUPS.
001450  172300                          .WORD   172300          ;KIPDR0
001452  172340                          .WORD   172340          ;KIPAR0
001454  177600                          .WORD   177600          ;UIPDR0
001456  177640                          .WORD   177640          ;UIPAR0
001460  021010                  STRTAB: .WORD   TST1            ;STARTING ADDRESS OF TEST ONE
001462  021522                          .WORD   ENTPT2          ;ADDRESS OF ENTRY POINT 2
001464  022104                          .WORD   ENTPT3          ;ADDRESS OF ENTRY POINT 3
001466  025100                          .WORD   ENTPT4          ;ADDRESS OF ENTRY POINT 4
001470  027216                          .WORD   ENTPT5          ;ADDRESS OF ENTRY POINT 5
001472  033706                          .WORD   ENTPT6          ;ADDRESS OF ENTRY POINT 6
001474  036012                          .WORD   ENTPT7          ;ADDRESS OF ENTRY POINT 7
```

```
                                .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

001476                          $ERRTB:

                                ;ITEM 1
001476  002516                  EM1                     ;UNEXPECTED CPU TRAP OR ABORT THRU 'ERRVEC' (004)
001500  007753                  DH1                     ;TESTNO  PC AT ABORT
001502  013724                  DT1                     ;TESTNO,BADPC,0
001504  014656                  DF1                     ;0,0

                                ;ITEM 2
001506  002516                  EM1                     ;UNEXPECTED CPU TRAP OR ABORT THRU 'ERRVEC' (004)
001510  007776                  DH2                     ;CPU ERR TESTNO  PC AT ABORT
001512  013732                  DT2                     ;PCPUER,TESTNO,BADPC,0
001514  014660                  DF2                     ;0,0,0

                                ;ITEM 3
001516  002577                  EM3                     ;UNEXPECTED CACHE PARITY ERROR THRU 'CACHVEC' (114)
001520  010032                  DH3                     ;MEM ERR CONTROL HITMISS
                                                        ;REGISTR REGISTR REGISTR TESTNO  PC AT ABORT
001522  013742                  DT3                     ;PPARER,PCONTR,PHITMI,TESTNO,BADPC,0
001524  014663                  DF3                     ;0,0,0,0,0

                                ;ITEM 4
001526  002715                  EM4                     ;UNEXPECTED MAIN MEMORY PARITY ERROR THRU 'CACHVEC' (114)
001530  010032                  DH3                     ;MEM ERR  CONTROL HITMISS
                                                        ;REGISTR REGISTR REGISTR TESTNO  PC AT ABORT
001532  013742                  DT3                     ;PPARER,PCONTR,PHITMI,TESTNO,BADPC,0
001534  014663                  DF3                     ;0,0,0,0,0

                                ;ITEM 5
001536  003040                  EM5                     ;UNEXPECTED MEMORY MANAGEMENT TRAP OR ABORT
001540  010140                  DH5                     ;ERROR   VIRTUAL
                                                        ;REGISTR ADDRESS TESTNO  PC AT ABORT
001542  013756                  DT5                     ;PMMR0,PMMR2,TESTNO,BADPC,0
001544  014670                  DF5                     ;0.0,0,0

                                ;ITEM 6
001546  003113                  EM6                     ;MEMORY MANAGEMENT TRAP OR ABORT HAD INCORRECT CONDITION
001550  010224                  DH6                     ;EXPECTD ERROR   VIRTUAL
                                                        ;CONDITN REGISTR ADDRESS TESTNO  PC AT ABORT
001552  013770                  DT6                     ;MMEXP,PMMR0,PMMR2,TESTNO.BADPC,0
001554  014674                  DF6                     ;0.0,0,0,0
```

```
930
931                                     ;ITEM 7
932  001556  003203                     EM7     ;MEMORY MANAGEMENT REGISTER 0 WILL NOT CLEAR
933  001560  010330                     DH7     ;(MMR0)  TESTNO  ERRORPC
934  001562  014004                     DT7     ;$REG1,TESTNO,$ERRPC,0
935  001564  014701                     DF7     ;0,0,0
936
937                                     ;ITEM 10
938  001566  003257                     EM10    ;CAN'T SET 160000 INTO MMR0
939  001570  010330                     DH7     ;(MMR0)  TESTNO  ERRORPC
940  001572  014004                     DT7     ;$REG1,TESTNO,$ERRPC,0
941  001574  014701                     DF7     ;0,0,0
942
943                                     ;ITEM 11
944  001576  003310                     EM11    ;GOT THE WRONG DATA BACK FROM MMR0
945  001600  010360                     DH11    ;LOADED  RECEIVD TESTNO  ERRORPC
946  001602  014014                     DT11    ;$REG2,$REG1,TESTNO,$ERRPC,0
947  001604  014704                     DF11    ;0,0,0,0
948
949                                     ;ITEM 12
950  001606  003352                     EM12    ;MMR2 DID NOT TRACK PROPERLY
951  001610  010420                     DH12    ;EXPECTD (MMR2)  TESTNO  ERRORPC
952  001612  014026                     DT12    ;$REG3,$REG2,TESTNO,$ERRPC
953  001614  014710                     DF12    ;0,0,0,0
954
955                                     ;ITEM 13
956  001616  003406                     EM13    ;SUMMARY OF PAR/PDR REFERENCE TIMEOUTS
957  001620  010460                     DH13    ;ADDROR  ADDRAND TESTNO ERRORPC  #ERRORS
958  001622  014040                     DT13    ;ADDROR,ADRAND,TESTNO,$ERRPC,$TMP5,0
959  001624  014714                     DF13    ;0,0,0,0,1
960
961                                     ;ITEM 14
962  001626  003454                     EM14    ;FOLLOWING PAR/PDR WILL NOT ZERO
963  001630  010531                     DH14    ;ADDRESS DATA    TESTNO  ERRORPC
964  001632  014054                     DT14    ;$REG0,$REG2,TESTNO,$ERRPC,0
965  001634  014721                     DF14    ;0,0,0,0
966
967                                     ;ITEM 15
968  001636  003515                     EM15    ;SUMMARY OF DUAL ADDRESSING ERRORS
969  001640  010571                     DH15    ;ADDROR  ADDRAND ADDROR  ADDRAND
970                                             ;LOADED  LOADED ENABLED ENABLED TESTNO ERRORPC  #ERRORS
971  001642  014066                     DT15    ;ADDROR,ADRAND,DATAOR,DATAND,TESTNO,$ERRPC,$TMP5,0
972  001644  014725                     DF15    ;0,0,0,0,0,0,1
973
974                                     ;ITEM 16
975  001646  003557                     EM16    ;SUMMARY OF COUNT PATTERN FAILURES
976  001650  010720                     DH16    ;ADDROR  ADDRAND PATRNOR PATRNAD DATAOR  DATAAND TESTNO ERRORPC
977  001652  014106                     DT16    ;ADDROR ADRAND,PATTOR,PATAMD,DATAOR,DATAND,TESTNO,$ERRPC.$TMP5.0
978  001654  014734                     DF16    ;0.0,0,0,0,0,0,0,1
979
980                                     ;ITEM 17
981  001656  003621                     EM17    ;ERROR IN BYTE ADDRESSING OF PAR/PDR
982  001660  011027                     DH17    ;ADDRESS EXPECTD RECEIVD TESTNO  ERRORPC
983  001662  014132                     DT17    ;$REG0,$REG2,$REG1,TESTNO,$ERRPC,0
984  001664  014745                     DF17    ;0,0,0,0,0
985
```

```
 986
 987  001666  003665          ;ITEM 20
 988  001670  011077          EM20            ;ONE OF THE REGISTERS TIMED OUT
 989  001672  014146          DH20            ;REGADDR TESTNO  ERRORPC
 990  001674  014752          DT20            ;$REG0,TESTNO,$ERRPC,0
 991                          DF20            ;0,0,0
 992
 993  001676  003724          ;ITEM 21
 994  001700  011127          EM21            ;STACK LIMIT REGISTER WOULD NOT CLEAR
 995  001702  014156          DH21            ;REGADDR DATA    TESTNO  ERRORPC
 996  001704  014755          DT21            ;$REG0,$REG1,TESTNO,$ERRPC,0
 997                          DF21            ;0,0,0,0
 998
 999  001706  003771          ;ITEM 22
1000  001710  011167          EM22            ;ERROR LOG REG.DID NOT HAVE CORRECT BIT SET
1001  001712  014170          DH22            ;REGADR EXPECTD RECEIVD TESTNO ERRORPC
1002  001714  014761          DT22            ;$TMP4,$TMP5,$REG0,TESTNO,$ERRPC,0
1003                          DF22            ;0,0,0,0,0
1004
1005  001716  004045          ;ITEM 23
1006  001720  011236          EM23            ;LOWER BYTE OF P.S.W. NOT CORRECT
1007  001722  014204          DH23            ;REGADDR DATAREC DATAEXP TESTNO  ERRORPC
1008  001724  014766          DT23            ;$REG0,$REG1,$REG2,TESTNO,$ERRPC,0
1009                          DF23            ;0,0,0,0,0
1010
1011  001726  004106          ;ITEM 24
1012  001730  011127          EM24            ;MMR1 DID NOT READ ALL ZEROES
1013  001732  014156          DH21            ;REGADDR DATA    TESTNO  ERRORPC
1014  001734  014755          DT21            ;$REG0,$REG1,TESTNO,$ERRPC,0
1015                          DF21            ;0,0,0,0
1016
1017  001736  004143          ;ITEM 25
1018  001740  011236          EM25            ;WRONG DATA BACK FROM STACK LIMIT REGISTER
1019  001742  014204          DH23            ;REGADDR DATAREC DATAEXP TESTNO  ERRORPC
1020  001744  014766          DT23            ;$REG0,$REG1,$REG2,TESTNO,$ERRPC,0
1021                          DF23            ;0,0,0,0,0
1022
1023  001746  004215          ;ITEM 26
1024  001750  011236          EM26            ;LOADED MORE THAN UPPER BYTE OF STACK LIMIT REGISTER
1025  001752  014204          DH23            ;REGADDR DATAREC DATAEXP TESTNO  ERRORPC
1026  001754  014766          DT23            ;$REG0,$REG1,$REG2,TESTNO,$ERRPC,0
1027                          DF23            ;0,0,0,0,0
1028
1029  001756  004301          ;ITEM 27
1030  001760  011306          EM27            ;KERNEL STACK POINTER NOT 1100 AFTER LOADING USP
1031  001762  014220          DH27            ;KSP     TESTNO  ERRORPC
1032  001764  014773          DT27            ;$REG0,TESTNO,$ERRPC,0
1033                          DF27            ;0,0,0
1034
1035  001766  004361          ;ITEM 30
1036  001770  011336          EM30            ;DUAL ADDRESSING BETWEEN PAR/PDR GROUPS
1037                          DH30            ;INDEX   INDEX   PAR/PDR
1038  001772  014230                          ;EXPECTD RECEIVD ADRREAD TESTNO  ERRORPC
1039  001774  014776          DT30            ;$REG0,$REG1,$REG2,TESTNO,$ERRPC,0
1040                          DF30            ;0,0,0,0,0
1041
                              ;ITEM 31
```

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1042  001776  004430                EM31                    ;BAD RELOCATION, ON STORING DATA 18-BIT MAPPING
1043  002000  011436                DH31                    ;VIRTUAL          PHYSCAL DATA    DATA
1044                                                        ;ADDRESS KIPAR4  ADDRESS EXPECTD RECEIVD TESTNO ERRORPC
1045  002002  014244                DT31                    ;$REG0,$TMP1,$TMP2,$REG1,$REG2,TESTNO,$ERRPC,0
1046  002004  015003                DF31                    ;0,0,0,0,0,0,0
1047
1048                                ;ITEM 32
1049  002006  004507                EM32                    ;18-BIT MAPPING POSSIBLE HOLE IN MAIN MEMORY FROM
1050  002010  011572                DH32                    ;STRTADR FNSHADR TESTNO ERRORPC
1051  002012  014264                DT32                    ;$TMP1,$TMP2,TESTNO,$ERRPC,0
1052  002014  015012                DF32                    ;2,2,0,0
1053
1054                                ;ITEM 33
1055  002016  004570                EM33                    ;FAULTY CARRY PROPAGATION 18-BIT MAPPING.
1056  002020  011632                DH33                    ;PATTERN DATA     ADDRESS
1057                                                        ;LOADED  FETCHED INTENDD  KIPAR4  KIPAR5  TESTNO  ERRORPC
1058  002022  014276                DT33                    ;$REG2,$REG3,$REG0,$TMP3,$TMP4,TESTNO,$ERRPC,0
1059  002024  015016                DF33                    ;0,0,0,0,0,0,0
1060
1061                                ;ITEM 34
1062  002026  004641                EM34                    ;DIDN'T GET WRAP AROUND TO ADDRESS ZERO
1063  002030  011752                DH34                    ;DATA    TESTNO  ERRORPC
1064  002032  014316                DT34                    ;$REG1,TESTNO,$ERRPC,0
1065  0C2034  015025                DF34                    ;0,0,0
1066
1067                                ;ITEM 35
1068  002036  004710                EM35                    ;PAGE LENGTH ABORT AT WRONG VIRTUAL ADDRESS
1069  002040  012002                DH35                    ;PGLENFD VABLKNO TESTNO  ERRORPC
1070  002042  014326                DT35                    ;$REG1,$REG3,TESTNO,$ERRPC,0
1071  002044  015030                DF35                    ;0,0,0,0
1072
1073                                ;ITEM 36
1074  002046  004763                EM36                    ;NO PAGE LENGTH ABORT, WHEN CONDITION CORRECT
1075  002050  012002                DH35                    ;PGLENFD VABLKNO TESTNO  ERRORPC
1076  002052  014326                DT35                    ;$REG1,$REG3,TESTNO,$ERRPC,0
1077  002054  015030                DF35                    ;0,0,0,0
1078
1079                                ;ITEM 37
1080  002056  005040                EM37                    ;DID NOT ABORT ON ACCESS OF NON-RESIDENT PAGE THRU KIPDR5
1081  002060  012042                DH37                    ;KIPDR5  KIPAR5  VIRTADR TESTNO  ERRORPC
1082  002062  014340                DT37                    ;$TMP0,$TMP1,$TMP2,TESTNO,$ERRPC,0
1083  002064  015034                DF37                    ;0,0,0,0,0
1084
1085                                ;ITEM 40
1086  002066  005131                EM40                    ;DID NOT ABORT ON WRITE TO READ ONLY PAGE THRU KIPDR4
1087  002070  012112                DH40                    ;KIPDR4  KIPAR4  VIRTADR TESTNO  ERRORPC
1088  002072  014340                DT37                    ;$TMP0,$TMP1,$TMP2,TESTNO,$ERRPC,0
1089  002074  015034                DF37                    ;0,0,0,0,0
1090
1091                                ;ITEM 41
1092  002076  005216                EM41                    ;POINTER VALUE 400 CAUSED STACK VIOLATION
1093  002100  012162                DH41                    ;STKPTR STKLMT TESTNO ERRORPC
1094  002102  014354                DT41                    ;$REG2,$REG3,TESTNO.$ERRPC,0
1095  002104  015041                DF41                    ;0,0.0,0
1096
1097                                ;ITEM 42
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1098  002106  005267          EM42            ;YELLOW ZONE VIOLATION EXPECTED-GOT NONE
1099  002110  012162          DH41            ;STKPTR STKLMT TESTNO ERRORPC
1100  002112  014354          DT41            ;$REG2,$REG3,TESTNO,$ERRPC,0
1101  002114  015041          DF41            ;0,0,0,0
1102
1103                          ;ITEM 43
1104  002116  005337          EM43            ;YELLOW ZONE VIOLATION EXPECTED-GOT RED
1105  002120  012162          DH41            ;STKPTR STKLMT TESTNO ERRORPC
1106  002122  014354          DT41            ;$REG2,$REG3,TESTNO,$ERRPC,0
1107  002124  015041          DF41            ;0,0,0,0
1108
1109                          ;ITEM 44
1110  002126  005406          EM44            ;RED ZONE VIOLATION EXPECTED-GOT NONE
1111  002130  012162          DH41            ;STKPTR STKLMT TESTNO ERRORPC
1112  002132  014354          DT41            ;$REG2,$REG3,TESTNO,$ERRPC,0
1113  002134  015041          DF41            ;0,0,0,0
1114
1115                          ;ITEM 45
1116  002136  005453          EM45            ;RED ZONE VIOLATION DID NOT CAUSE ABORT
1117  002140  012162          DH41            ;STKPTR STKLMT TESTNO ERRORPC
1118  002142  014354          DT41            ;$REG2,$REG3,TESTNO,$ERRPC,0
1119  002144  015041          DF41            ;0,0,0,0
1120
1121                          ;ITEM 46
1122  002146  005522          EM46            ;RED ZONE VIOLATION EXPECTED - GOT YELLOW
1123  002150  012162          DH41            ;STKPTR STKLMT TESTNO ERRORPC
1124  002152  014354          DT41            ;$PEG2,$REG3,TESTNO,$ERRPC,0
1125  002154  015041          DF41            ;0,0,0,0
1126
1127                          ;ITEM 47
1128  002156  005573          EM47            ;ERROR DURING ERROR-ON-ERROR TRAP SEQUENCE
1129                                          ;EXPECTED:
1130  002160  012222          DH47            ;PSW    STK PTR (MMR0) (MMR2) TESTNO ERRORPC
1131                                          ;140017 -11/6X- 000000 020151
1132                                          ;140000 -11/40- 4&1074
1133                                          ;RECEIVED:
1134                                          ;PSW    PC      STK PTR (MMR0) (MMR2) TESTNO ERRORPC
1135  002162  014366          DT47            ;$REG2,$REG3,$REG1,PMMR0,PMMR2,TESTNO,$ERRPC,0
1136  002164  015045          DF47            ;0,0,0,0,0,0,0
1137
1138                          ;ITEM 50
1139  002166  005657          EM50            ;AT LEAST ONE M.M. STATUS REGISTERS WAS CLOCKED AFTER BEING LOCK
1140  002170  012465          DH50            ;ORIGINAL DATA          NEW DATA
1141                                          ;(MMR0)  (MMR2)  (MMR0)  (MMR2)  TESTNO  ERRORPC
1142  002172  014406          DT50            ;PMMR0,PMMR2,$TMP0,$TMP2,TESTNO,$ERRPC,0
1143  002174  015054          DF50            ;0,0,0,0,0,0
1144
1145                          ;ITEM 51
1146  002176  005761          EM51            ;DID NOT CHANGE MAPPING TO USER MODE
1147  002200  012042          DH37            ;TESTNO  ERRORPC
1148  002202  014340          DT37            ;TESTNO,$ERRPC,0
1149  002204  015034          DF37            ;0,0
1150
1151                          ;ITEM 52
1152  002206  006025          EM52            ;ABORT CONDITION INCORRECT EXPECTING 100153
1153  002210  012576          DH52            ;RECEIVD (MMR2)  TESTNO  ERRORPC
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1154  002212  014424  DT52            ;PMMR0,PMMR2,TESTNO,$ERRPC,0
1155  002214  015062  DF52            ;0,0,0,0
1156
1157                  ;ITEM 53
1158  002216  006100  EM53            ;MMR2 LOCKED UP THE WRONG VIRTUAL ADDRESS
1159  002220  012636  DH53            ;VIRTADR (MMR2)  TESTNO  ERRORPC
1160  002222  014436  DT53            ;$REG1,PMMR2,TESTNO,$ERRPC,0
1161  002224  015066  DF53            ;0,0,0,0
1162
1163                  ;ITEM 54
1164  002226  006151  EM54            ;MMR0 LOCKED UP THE WRONG PAGE NUMBER
1165  002230  012676  DH54            ;EXPECTD (MMR0)  TESTNO  ERRORPC
1166  002232  014450  DT54            ;$REG2,PMMR0,TESTNO,$ERRPC,0
1167  002234  015072  DF54            ;0,0,0,0
1168
1169                  ;ITEM 55
1170  002236  006216  EM55            ;W-BIT NOT SET ON WRITE TO PAGE 4
1171  002240  012736  DH55            ;KIPDR4  TESTNO  ERRORPC
1172  002242  014462  DT55            ;$TMP0,TESTNO,$ERRPC,0
1173  002244  015076  DF55            ;0,0,0
1174
1175                  ;ITEM 56
1176  002246  006257  EM56            ;W-BIT DID NOT REMAIN SET ON M.M. ABORT AT PAGE 4
1177  002250  012736  DH55            ;KIPDR4  TESTNO  ERRORPC
1178  002252  014462  DT55            ;$TMP0,TESTNO,$ERRPC,0
1179  002254  015076  DF55            ;0,0,0
1180
1181                  ;ITEM 57
1182  002256  006340  EM57            ;W-BIT DID NOT CLEAR ON WRITE TO KIPDR4
1183  002260  012736  DH55            ;KIPDR4  TESTNO  ERRORPC
1184  002262  014462  DT55            ;$TMP0,TESTNO,$ERRPC,0
1185  002264  015076  DF55            ;0,0,0
1186
1187                  ;ITEM 60
1188  002266  006407  EM60            ;W-BIT WRONG ON WRITE TO PSW
1189  002270  012766  DH60            ;KIPDR7  TESTNO  ERRORPC
1190  002272  014462  DT55            ;$TMP0,TESTNO,$ERRPC,0
1191  002274  015076  DF55            ;0,0,0
1192
1193                  ;ITEM 61
1194  002276  006443  EM61            ;W-BIT SET AFTER WRITE TO PDR 4
1195  002300  012766  DH60            ;KIPDR7  TESTNO  ERRORPC
1196  002302  014462  DT55            ;$TMP0,TESTNO,$ERRPC,0
1197  002304  015076  DF55            ;0,0,0
1198
1199                  ;ITEM 62
1200  002306  006502  EM62            ;DUAL MAPPING BETWEEN PAGES
1201  002310  013016  DH62            ;GDPAGE  BDPAGE  TESTNO  ERRORPC
1202  002312  014472  DT62            ;$REG3,$REG1,TESTNO,$ERRPC,0
1203  002314  015101  DF62            ;0,0,0,0
1204
1205                  ;ITEM 63
1206  002316  006535  EM63            ;NO PAGE HAD ITS BIT SET
1207  002320  013056  DH63            ;TSTPAGE CONTENT TESTNO  ERRORPC
1208  002322  014504  DT63            ;$REG3,$REG0,TESTNO,$ERRPC,0
1209  002324  015105  DF63            ;0,0,0,0
```

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1210
1211                                    ;ITEM 64
1212  002326  006565                    EM64    ;DID NOT PICK UP CORRECT STACK POINTER
1213  002330  013116                    DH64    ;EXPECTD RECEIVD TESTNO  ERRORPC
1214  002332  014516                    DT64    ;$REG2,$REG1,TESTNO,$ERRPC,0
1215  002334  015111                    DF64    ;0,0,0,0
1216
1217                                    ;ITEM 65
1218  002336  006633                    EM65    ;CURRENT MODE STACK NOT PUSHED IN MFP INSTRUCTION
1219  002340  012042                    DH37    ;TESTNO  ERRORPC
1220  002342  014340                    DT37    ;TESTNO,$ERRPC,0
1221  002344  015034                    DF37    ;0,0
1222
1223                                    ;ITEM 66
1224  002346  006714                    EM66    ;WRONG DATA FETCHED BY MFP INSTRUCTION
1225  002350  013156                    DH66    ;EXPECTD RECEIVD TESTNO  ERRORPC
1226  002352  014530                    DT66    ;$REG0,$REG1,TESTNO,$ERRPC,0
1227  002354  015115                    DF66    ;0,0,0,0
1228
1229                                    ;ITEM 67
1230  002356  006762                    EM67    ;TRIED TO REFERENCE NON-RESIDENT PAGE
1231  002360  013216                    DH67    ;(MMR0)  (MMR2)  TESTNO  ERRORPC
1232  002362  014542                    DT67    ;PMMR0,PMMR2,TESTNO,$ERRPC,0
1233  002364  015121                    DF67    ;0,0,0,0
1234
1235                                    ;ITEM 70
1236  002366  007027                    EM70    ;STACK POINTER NOT CHANGED BY MTP INSTRUCTION
1237  002370  013256                    DH70    ;STKPTR  TESTNO  ERRORPC
1238  002372  014554                    DT70    ;$REG1,TESTNO,$ERRPC,0
1239  002374  015125                    DF70    ;0,0,0
1240
1241                                    ;ITEM 71
1242  002376  007104                    EM71    ;INCORRECT STORE BY MTP INSTRUCTION
1243  002400  013306                    DH71    ;GDDATA  STORED  TESTNO  ERRORPC
1244  002402  014530                    DT66    ;$REG0,$REG1,TESTNO,$ERRPC,0
1245  002404  015115                    DF66    ;0,0,0,0
1246
1247                                    ;ITEM 72
1248  002406  007147                    EM72    ;ABORTED THRU RIGHT VECTOR BUT PICKED UP WRONG PSW
1249  002410  013346                    DH72    ;(PSW)   TESTNO  ERRORPC EXPECTING XXX340
1250  002412  014564                    DT72    ;$REG0,TESTNO,$ERRPC,0
1251  002414  015130                    DF72    ;0,0,0
1252
1253                                    ;ITEM 73
1254  002416  007231                    EM73    ;ABORTED THRU USER SPACE, USER PSW IS XXX000
1255  002420  013417                    DH73    ;(PSW)   TESTNO  ERRORPC
1256  002422  014564                    DT72    ;$REG0,TESTNO,$ERRPC,0
1257  002424  015130                    DF72    ;0,0,0
1258
1259                                    ;ITEM 74
1260  002426  007305                    EM74    ;DID NOT ABORT REFERENCE TO A MEMORY MANAGEMENT REGISTER
1261  002430  013447                    DH74    ;TESTNO  ERRORPC
1262  002432  014574                    DT74    ;TESTNO,$ERRPC,0
1263  002434  015133                    DF74    ;0,0
1264
1265                                    ;ITEM 75
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1266  002436  007375                EM75                    ;CPU ERROR REG. DID NOT REPORT YELLOW ZONE
1267  002440  013466                DH75                    ;STKPTR STKLMT CPUERR TESTNO ERRORPC
1268  002442  014602                DT75                    ;$REG2,$REG3,PCPUER,TESTNO,$ERRPC,0
1269  002444  015135                DF75                    ;0,0,0,0,0
1270
1271                                ;ITEM 76
1272  002446  007447                EM76                    ;CPU ERROR REG. DID NOT REPORT RED ZONE
1273  002450  013466                DH75                    ;STKPTR STKLMT CPUERR TESTNO ERRORPC
1274  002452  014602                DT75                    ;$REG2,$REG3,PCPUER,TESTNO,$ERRPC,0
1275  002454  015135                DF75                    ;0,0,0,0,0
1276
1277                                ;ITEM 77
1278  002456  002715                EM4                     ;UNEXPECTED MAIN MEMORY PARITY ERROR THRU 'CACHVEC' (114)
1279  002460  007753                DH1                     ;TESTNO  PC AT ABORT
1280  002462  013724                DT1                     ;TESTNO,BADPC,0
1281  002464  014656                DF1                     ;0,0
1282
1283
1284
1285  002466                        ER200:                  ;STARTING ADDRESS FOR ITEM 201-377
1286
1287                                ;ITEM 201
1288  002466  007516                EM201                   ;THE FOLLOWING ARE PAR/PDR REFERENCE TIMEOUTS
1289  002470  013536                DH201                   ;ADDRESS TESTNO ERRORPC
1290
1291                                ;ITEM 301
1292  002472  014616                DT201                   ;$REG0,TESTNO,$ERRPC,0
1293  002474  015142                DF201                   ;0,0,0
1294
1295                                ;ITEM 202
1296  002476  007573                EM202                   ;THE FOLLOWING ARE DUAL ADDRESSING ERRORS FOR PAR'S/PDR'S
1297  002500  013565                DH202                   ;ADDRESS ADDRESS
1298                                                        ;LOADED  JUST READ TESTNO ERRORPC
1299
1300                                ;ITEM 302
1301  002502  014626                DT202                   ;$REG0,$REG1,TESTNO.$ERRPC,0
1302  002504  015145                DF202                   ;0.0,0,0
1303
1304                                ;ITEM 203
1305  002506  007664                EM203                   ;THE FOLLOWING ARE COUNT PATTERN ERRORS FOR PAR'S/PDR'S
1306  002510  013645                DH203                   ;ADDRESS RECEIVD  EXPECTD COUNT   TESTNO ERRORPC
1307
1308                                ;ITEM 303
1309  002512  014640                DT203                   ;$REG0,$REG2,$REG4.$REG1,TESTNO.$ERRPC,0
1310  002514  015151                DF203                   ;0,0,0,0,0,0
1311
1312
1313                                .SBTTL  ERROR TABLE MESSAGES AND DATA POINTERS
1314  002516  047125  054105  042520  EM1:    .ASCIZ  ?UNEXPECTED CPU TRAP OR ABORT THRU 'ERRVEC' (004)?
1315  002524  052103  042105  041440
1316  002532  052520  052040  040522
1317  002540  020120  051117  040440
1318  002546  047502  052122  052040
1319  002554  051110  020125  042447
1320  002562  051122  042526  023503
1321  002570  024040  030060  024464
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1322  002576    000
1323  002577    125  042516  050130  EM3:    .ASCII  ?UNEXPECTED CACHE PARITY ERROR THRU 'CACHVEC' (114)?<CRLF>
1324  002604  041505  042524  020104
1325  002612  040503  044103  020105
1326  002620  040520  044522  054524
1327  002626  042440  051122  051117
1328  002634  052040  051110  020125
1329  002642  041447  041501  053110
1330  002650  041505  020047  030450
1331  002656  032061  100051
1332  002662  044527  046114  051040          .ASCIZ  ?WILL RETRY THIS TEST ONCE.?
1333  002670  052105  054522  052040
1334  002676  044510  020123  042524
1335  002704  052123  047440  041516
1336  002712  027105    000
1337  002715    125  042516  050130  EM4:    .ASCII  ?UNEXPECTED MAIN MEMORY PARITY ERROR THRU 'CACHVEC' (114)?<CRLF>
1338  002722  041505  042524  020104
1339  002730  040515  047111  046440
1340  002736  046505  051117  020131
1341  002744  040520  044522  054524
1342  002752  042440  051122  051117
1343  002760  052040  051110  020125
1344  002766  041447  041501  053110
1345  002774  041505  020047  030450
1346  003002  032061  100051
1347  003006  044527  046114  051040          .ASCIZ  ?WILL RETRY THIS TEST ONCE?
1348  003014  052105  054522  052040
1349  003022  044510  020123  042524
1350  003030  052123  047440  041516
1351  003036  000105
1352
1353  003040  047125  054105  042520  EM5:    .ASCIZ  ?UNEXPECTED MEMORY MANAGEMENT TRAP OR ABORT?
1354  003046  052103  042105  046440
1355  003054  046505  051117  020131
1356  003062  040515  040516  042507
1357  003070  042515  052116  052040
1358  003076  040522  020120  051117
1359  003104  040440  047502  052122
1360  003112    000
1361  003113    115  046505  051117  EM6:    .ASCIZ  ?MEMORY MANAGEMENT TRAP OR ABORT HAD INCORRECT CONDITION?
1362  003120  020131  040515  040516
1363  003126  042507  042515  052116
1364  003134  052040  040522  020120
1365  003142  051117  040440  047502
1366  003150  052122  044040  042101
1367  003156  044440  041516  051117
1368  003164  042522  052103  041440
1369  003172  047117  044504  044524
1370  003200  047117    000
1371  003203    115  046505  051117  EM7:    .ASCIZ  ?MEMORY MANAGEMENT REGISTER 0 WILL NOT CLEAR?
1372  003210  020131  040515  040516
1373  003216  042507  042515  052116
1374  003224  051040  043505  051511
1375  003232  042524  020122  020060
1376  003240  044527  046114  047040
1377  003246  052117  041440  042514
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1378  003254  051101     000
1379  003257     103  047101  052047  EM10:   .ASCIZ  ?CAN'T SET 160000 IN MMR0?
1380  003264  051440  052105  030440
1381  003272  030066  030060  020060
1382  003300  047111  046440  051115
1383  003306  000060
1384  003310  047507  020124  044124  EM11:   .ASCIZ  ?GOT THE WRONG DATA BACK FROM MMR0?
1385  003316  020105  051127  047117
1386  003324  020107  040504  040524
1387  003332  041040  041501  020113
1388  003340  051106  046517  046440
1389  003346  051115  000060
1390  003352  046515  031122  042040  EM12:   .ASCIZ  ?MMR2 DID NOT TRACK PROPERLY?
1391  003360  042111  047040  052117
1392  003366  052040  040522  045503
1393  003374  050040  047522  042520
1394  003402  046122  000131
1395  003406  052523  046515  051101  EM13:   .ASCIZ  ?SUMMARY OF PAR/PDR REFERENCE TIMEOUTS?
1396  003414  020131  043117  050040
1397  003422  051101  050057  051104
1398  003430  051040  043105  051105
1399  003436  047105  042503  052040
1400  003444  046511  047505  052125
1401  003452  000123
1402  003454  047506  046114  053517  EM14:   .ASCIZ  ?FOLLOWING PAR/PDR WILL NOT CLEAR?
1403  003462  047111  020107  040520
1404  003470  027522  042120  020122
1405  003476  044527  046114  047040
1406  003504  052117  041440  042514
1407  003512  051101     000
1408  003515     123  046525  040515  EM15:   .ASCIZ  ?SUMMARY OF DUAL ADDRESSING ERRORS?
1409  003522  054522  047440  020106
1410  003530  052504  046101  040440
1411  003536  042104  042522  051523
1412  003544  047111  020107  051105
1413  003552  047522  051522     000
1414  003557     123  046525  040515  EM16:   .ASCIZ  ?SUMMARY OF COUNT PATTERN FAILURES?
1415  003564  054522  047440  020106
1416  003572  047503  047125  020124
1417  003600  040520  052124  051105
1418  003606  020116  040506  046111
1419  003614  051125  051505     000
1420  003621     105  051122  051117  EM17:   .ASCIZ  ?ERROR IN BYTE ADDRESSING OF PAR/PDR?
1421  003626  044440  020116  054502
1422  003634  042524  040440  042104
1423  003642  042522  051523  047111
1424  003650  020107  043117  050040
1425  003656  051101  050057  051104
1426  003664     000
1427  003665     117  042516  047440  EM20:   .ASCIZ  ?ONE OF THE REGISTERS TIMED OUT?
1428  003672  020106  044124  020105
1429  003700  042522  044507  052123
1430  003706  051105  020123  046524
1431  003714  042515  020104  052517
1432  003722  000124
1433  003724  052123  041501  020113  EM21:   .ASCIZ  ?STACK LIMIT REGISTER WOULD NOT CLEAR?
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1434  003732  044514  044515  020124
1435  003740  042522  044507  052123
1436  003746  051105  053440  052517
1437  003754  042114  047040  052117
1438  003762  041440  042514  051101
1439  003770     000
1440  003771     105  051122  051117  EM22:   .ASCIZ  ?ERROR LOG REG. DID NOT HAVE CORRECT BIT SET?
1441  003776  046040  043517  051040
1442  004004  043505  020056  044504
1443  004012  020104  047516  020124
1444  004020  040510  042526  041440
1445  004026  051117  042522  052103
1446  004034  041040  052111  051440
1447  004042  052105     000
1448  004045     114  053517  051105  EM23:   .ASCIZ  ?LOWER BYTE OF P.S.W. NOT CORRECT?
1449  004052  041040  052131  020105
1450  004060  043117  050040  051456
1451  004066  053456  020056  047516
1452  004074  020124  047503  051122
1453  004102  041505  000124
1454  004106  046515  030522  042040  EM24:   .ASCIZ  ?MMR1 DID NOT READ ALL ZEROES?
1455  004114  042111  047040  052117
1456  004122  051040  040505  020104
1457  004130  046101  020114  042532
1458  004136  047522  051505     000
1459  004143     127  047522  043516  EM25:   .ASCIZ  ?WRONG DATA BACK FROM STACK LIMIT REGISTER?
1460  004150  042040  052101  020101
1461  004156  040502  045503  043040
1462  004164  047522  020115  052123
1463  004172  041501  020113  044514
1464  004200  044515  020124  042522
1465  004206  044507  052123  051105
1466  004214     000
1467  004215     114  040517  042504  EM26:   .ASCIZ  ?LOADED MORE THAN UPPER BYTE OF STACK LIMIT REGISTER?
1468  004222  020104  047515  042522
1469  004230  052040  040510  020116
1470  004236  050125  042520  020122
1471  004244  054502  042524  047440
1472  004252  020106  052123  041501
1473  004260  020113  044514  044515
1474  004266  020124  042522  044507
1475  004274  052123  051105     000
1476  004301     113  051105  042516  EM27:   .ASCIZ  ?KERNEL STACK POINTER NOT 1100 AFTER LOADING USP?
1477  004306  020114  052123  041501
1478  004314  020113  047520  047111
1479  004322  042524  020122  047516
1480  004330  020124  030461  030060
1481  004336  040440  052106  051105
1482  004344  046040  040517  044504
1483  004352  043516  052440  050123
1484  004360     000
1485  004361     104  040525  020114  EM30:   .ASCIZ  ?DUAL ADDRESSING BETWEEN PAR/PDR GROUPS?
1486  004366  042101  051104  051505
1487  004374  044523  043516  041040
1488  004402  052105  042527  047105
1489  004410  050040  051101  050057
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1490  004416  051104  043440  047522
1491  004424  050125  000123
1492  004430  040502  020104  042522  EM31:   .ASCIZ  ?BAD RELOCATION, ON STORING DATA 18-BIT MAPPING?
1493  004436  047514  040503  044524
1494  004444  047117  020054  047117
1495  004452  051440  047524  044522
1496  004460  043516  042040  052101
1497  004466  020101  034061  041055
1498  004474  052111  046440  050101
1499  004502  044520  043516     000
1500  004507     061  026470  044502  EM32:   .ASCIZ  ?18-BIT MAPPING POSSIBLE HOLE IN MAIN MEMORY FROM?
1501  004514  020124  040515  050120
1502  004522  047111  020107  047520
1503  004530  051523  041111  042514
1504  004536  044040  046117  020105
1505  004544  047111  046440  044501
1506  004552  020116  042515  047515
1507  004560  054522  043040  047522
1508  004566  000115
1509  004570  040506  046125  054524  EM33:   .ASCIZ  ?FAULTY CARRY PROPAGATION 18-BIT MAPPING.?
1510  004576  041440  051101  054522
1511  004604  050040  047522  040520
1512  004612  040507  044524  047117
1513  004620  030440  026470  044502
1514  004626  020124  040515  050120
1515  004634  047111  027107     000
1516  004641     104  042111  023516  EM34:   .ASCIZ  ?DIDN'T GET WRAP AROUND TO ADDRESS ZERO?
1517  004646  020124  042507  020124
1518  004654  051127  050101  040440
1519  004662  047522  047125  020104
1520  004670  047524  040440  042104
1521  004676  042522  051523  055040
1522  004704  051105  000117
1523  004710  040520  042507  046040  EM35:   .ASCIZ  ?PAGE LENGTH ABORT AT WRONG VIRTUAL ADDRESS?
1524  004716  047105  052107  020110
1525  004724  041101  051117  020124
1526  004732  052101  053440  047522
1527  004740  043516  053040  051111
1528  004746  052524  046101  040440
1529  004754  042104  042522  051523
1530  004762     000
1531  004763     116  020117  040520  EM36:   .ASCIZ  ?NO PAGE LENGTH ABORT, WHEN CONDITION CORRECT?
1532  004770  042507  046040  047105
1533  004776  052107  020110  041101
1534  005004  051117  026124  053440
1535  005012  042510  020116  047503
1536  005020  042116  052111  047511
1537  005026  020116  047503  051122
1538  005034  041505  000124
1539  005040  044504  020104  047516  EM37:   .ASCIZ  ?DID NOT ABORT ON ACCESS OF NON-RESIDENT PAGE THRU KIPDR5?
1540  005046  020124  041101  051117
1541  005054  020124  047117  040440
1542  005062  041503  051505  020123
1543  005070  043117  047040  047117
1544  005076  051055  051505  042111
1545  005104  047105  020124  040520
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1546  005112  042507  052040  051110
1547  005120  020125  044513  042120
1548  005126  032522     000
1549  005131     104  042111  047040  EM40:   .ASCIZ  ?DID NOT ABORT ON WRITE TO READ ONLY PAGE THRU KIPDR4?
1550  005136  052117  040440  047502
1551  005144  052122  047440  020116
1552  005152  051127  052111  020105
1553  005160  047524  051040  040505
1554  005166  020104  047117  054514
1555  005174  050040  043501  020105
1556  005202  044124  052522  045440
1557  005210  050111  051104  000064
1558  005216  047520  047111  042524  EM41:   .ASCIZ  ?POINTER VALUE 400 CAUSED STACK VIOLATION?
1559  005224  020122  040526  052514
1560  005232  020105  030064  020060
1561  005240  040503  051525  042105
1562  005246  051440  040524  045503
1563  005254  053040  047511  040514
1564  005262  044524  047117     000
1565  005267     131  046105  047514  EM42:   .ASCIZ  ?YELLOW ZONE VIOLATION EXPECTED-GOT NONE?
1566  005274  020127  047532  042516
1567  005302  053040  047511  040514
1568  005310  044524  047117  042440
1569  005316  050130  041505  042524
1570  005324  026504  047507  020124
1571  005332  047516  042516     000
1572  005337     131  046105  047514  EM43:   .ASCIZ  ?YELLOW ZONE VIOLATION EXPECTED-GOT RED?
1573  005344  020127  047532  042516
1574  005352  053040  047511  040514
1575  005360  044524  047117  042440
1576  005366  050130  041505  042524
1577  005374  026504  047507  020124
1578  005402  042522  000104
1579  005406  042522  020104  047532  EM44:   .ASCIZ  ?RED ZONE VIOLATION EXPECTED-GOT NONE?
1580  005414  042516  053040  047511
1581  005422  040514  044524  047117
1582  005430  042440  050130  041505
1583  005436  042524  026504  047507
1584  005444  020124  047516  042516
1585  005452     000
1586  005453     122  042105  055040  EM45:   .ASCIZ  ?RED ZONE VIOLATION DID NOT CAUSE ABORT?
1587  005460  047117  020105  044526
1588  005466  046117  052101  047511
1589  005474  020116  044504  020104
1590  005502  047516  020124  040503
1591  005510  051525  020105  041101
1592  005516  051117  000124
1593  005522  042522  020104  047532  EM46:   .ASCIZ  ?RED ZONE VIOLATION EXPECTED - GOT YELLOW?
1594  005530  042516  053040  047511
1595  005536  040514  044524  047117
1596  005544  042440  050130  041505
1597  005552  042524  020104  020055
1598  005560  047507  020124  042531
1599  005566  046114  053517     000
1600  005573     105  051122  051117  EM47:   .ASCII  ?ERROR DURING ERROR-ON-ERROR TRAP SEQUENCE?<CRLF>
1601  005600  042040  051125  047111
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1602  005606  020107  051105  047522
1603  005614  026522  047117  042455
1604  005622  051122  051117  052040
1605  005630  040522  020120  042523
1606  005636  052521  047105  042503
1607  005644     200
1608  005645     105  050130  041505          .ASCIZ  ?EXFECTED:?
1609  005652  042524  035104     000
1610  005657     101  020124  042514  EM50:   .ASCIZ  ?AT LEAST ONE M.M. STATUS REGISTERS WAS CLOCKED AFTER BEING LOCKED?
1611  005664  051501  020124  047117
1612  005672  020105  027115  027115
1613  005700  051440  040524  052524
1614  005706  020123  042522  044507
1615  005714  052123  051105  020123
1616  005722  040527  020123  046103
1617  005730  041517  042513  020104
1618  005736  043101  042524  020122
1619  005744  042502  047111  020107
1620  005752  047514  045503  042105
1621  005760     000
1622  005761     104  042111  047040  EM51:   .ASCIZ  ?DID NOT CHANGE MAPPING TO USER MODE?
1623  005766  052117  041440  040510
1624  005774  043516  020105  040515
1625  006002  050120  047111  020107
1626  006010  047524  052440  042523
1627  006016  020122  047515  042504
1628  006024     000
1629  006025     101  047502  052122  EM52:   .ASCIZ  ?ABORT CONDITION INCORRECT EXPECTING 100153?
1630  006032  041440  047117  044504
1631  006040  044524  047117  044440
1632  006046  041516  051117  042522
1633  006054  052103  042440  050130
1634  006062  041505  044524  043516
1635  006070  030440  030060  032461
1636  006076  000063
1637  006100  046515  031122  046040  EM53:   .ASCIZ  ?MMR2 LOCKED UP THE WRONG VIRTUAL ADDRESS?
1638  006106  041517  042513  020104
1639  006114  050125  052040  042510
1640  006122  053440  047522  043516
1641  006130  053040  051111  052524
1642  006136  046101  040440  042104
1643  006144  042522  051523     000
1644  006151     115  051115  020060  EM54:   .ASCIZ  ?MMR0 LOCKED UP THE WRONG PAGE NUMBER?
1645  006156  047514  045503  042105
1646  006164  052440  020120  044124
1647  006172  020105  051127  047117
1648  006200  020107  040520  042507
1649  006206  047040  046525  042502
1650  006214  000122
1651  006216  026527  044502  020124  EM55:   .ASCIZ  ?W-BIT NOT SET ON WRITE TO PAGE 4?
1652  006224  047516  020124  042523
1653  006232  020124  047117  053440
1654  006240  044522  042524  052040
1655  006246  020117  040520  042507
1656  006254  032040     000
1657  006257     127  041055  052111  EM56:   .ASCIZ  ?W-BIT DID NOT REMAIN SET ON M.M. ABORT AT PAGE 4?
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1658  006264  042040  042111  047040
1659  006272  052117  051040  046505
1660  006300  044501  020116  042523
1661  006306  020124  047117  046440
1662  006314  046456  020056  041101
1663  006322  051117  020124  052101
1664  006330  050040  043501  020105
1665  006336  000064
1666  006340  026527  044502  020124  EM57:   .ASCIZ  ?W-BIT DID NOT CLEAR ON WRITE TO KIPDR4?
1667  006346  044504  020104  047516
1668  006354  020124  046103  040505
1669  006362  020122  047117  053440
1670  006370  044522  042524  052040
1671  006376  020117  044513  042120
1672  006404  032122     000
1673  006407     127  041055  052111  EM60:   .ASCIZ  ?W-BIT WRONG ON WRITE TO PSW?
1674  006414  053440  047522  043516
1675  006422  047440  020116  051127
1676  006430  052111  020105  047524
1677  006436  050040  053523     000
1678  006443     127  041055  052111  EM61:   .ASCIZ  ?W-BIT SET AFTER WRITE TO PDR 4?
1679  006450  051440  052105  040440
1680  006456  052106  051105  053440
1681  006464  044522  042524  052040
1682  006472  020117  042120  020122
1683  006500  000064
1684  006502  052504  046101  046440  EM62:   .ASCIZ  ?DUAL MAPPING BETWEEN PAGES?
1685  006510  050101  044520  043516
1686  006516  041040  052105  042527
1687  006524  047105  050040  043501
1688  006532  051505     000
1689  006535     116  020117  040520  EM63:   .ASCIZ  ?NO PAGE HAD ITS BIT SET?
1690  006542  042507  044040  042101
1691  006550  044440  051524  041040
1692  006556  052111  051440  052105
1693  006564     000
1694  006565     104  042111  047040  EM64:   .ASCIZ  ?DID NOT PICK UP CORRECT STACK POINTER?
1695  006572  052117  050040  041511
1696  006600  020113  050125  041440
1697  006606  051117  042522  052103
1698  006614  051440  040524  045503
1699  006622  050040  044517  052116
1700  006630  051105     000
1701  006633     103  051125  042522  EM65:   .ASCIZ  ?CURRENT MODE STACK NOT PUSHED IN MFP INSTRUCTION?
1702  006640  052116  046440  042117
1703  006646  020105  052123  041501
1704  006654  020113  047516  020124
1705  006662  052520  044123  042105
1706  006670  044440  020116  043115
1707  006676  020120  047111  052123
1708  006704  052522  052103  047511
1709  006712  000116
1710  006714  051127  047117  020107  EM66:   .ASCIZ  ?WRONG DATA FETCHED BY MFP INSTRUCTION?
1711  006722  040504  040524  043040
1712  006730  052105  044103  042105
1713  006736  041040  020131  043115
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1714  006744  020120  047111  052123
1715  006752  052522  052103  047511
1716  006760  000116
1717  006762  051124  042511  020104  EM67:   .ASCIZ  ?TRIED TO REFERENCE NON-RESIDENT PAGE?
1718  006770  047524  051040  043105
1719  006776  051105  047105  042503
1720  007004  047040  047117  051055
1721  007012  051505  042111  047105
1722  007020  020124  040520  042507
1723  007026     000
1724  007027     123  040524  045503  EM70:   .ASCIZ  ?STACK POINTER NOT CHANGED BY MTP INSTRUCTION?
1725  007034  050040  044517  052116
1726  007042  051105  047040  052117
1727  007050  041440  040510  043516
1728  007056  042105  041040  020131
1729  007064  052115  020120  047111
1730  007072  052123  052522  052103
1731  007100  047511  000116
1732  007104  047111  047503  051122  EM71:   .ASCIZ  ?INCORRECT STORE BY MTP INSTRUCTION?
1733  007112  041505  020124  052123
1734  007120  051117  020105  054502
1735  007126  046440  050124  044440
1736  007134  051516  051124  041525
1737  007142  044524  047117     000
1738  007147     101  047502  052122  EM72:   .ASCIZ  ?ABORTED THRU RIGHT VECTOR BUT PICKED UP WRONG PSW?
1739  007154  042105  052040  051110
1740  007162  020125  044522  044107
1741  007170  020124  042526  052103
1742  007176  051117  041040  052125
1743  007204  050040  041511  042513
1744  007212  020104  050125  053440
1745  007220  047522  043516  050040
1746  007226  053523     000
1747  007231     101  047502  052122  EM73:   .ASCIZ  ?ABORTED THRU USER SPACE, USER PSW IS XXX000?
1748  007236  042105  052040  051110
1749  007244  020125  051525  051105
1750  007252  051440  040520  042503
1751  007260  020054  051525  051105
1752  007266  050040  053523  044440
1753  007274  020123  054130  030130
1754  007302  030060     000
1755  007305     104  042111  047040  EM74:   .ASCIZ  ?DID NOT ABORT REFERENCE TO A MEMORY MANAGEMENT REGISTER?
1756  007312  052117  040440  047502
1757  007320  052122  051040  043105
1758  007326  051105  047105  042503
1759  007334  052040  020117  020101
1760  007342  042515  047515  054522
1761  007350  046440  047101  043501
1762  007356  046505  047105  020124
1763  007364  042522  044507  052123
1764  007372  051105     000
1765  007375     103  052520  042440  EM75:   .ASCIZ  ?CPU ERROR REG. DID NOT REPORT YELLOW ZONE?
1766  007402  051122  051117  051040
1767  007410  043505  020056  044504
1768  007416  020104  047516  020124
1769  007424  042522  047520  052122
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1770  007432  054440  046105  047514
1771  007440  020127  047532  042516
1772  007446     000
1773  007447     103  052520  042440  EM76:   .ASCIZ  ?CPU ERROR REG. DID NOT REPORT RED ZONE?
1774  007454  051122  051117  051040
1775  007462  043505  020056  044504
1776  007470  020104  047516  020124
1777  007476  042522  047520  052122
1778  007504  051040  042105  055040
1779  007512  047117  000105
1780
1781  007516  044124  020105  047506  EM201:  .ASCIZ  ?THE FOLLOWING ARE PAR/PDR REFERENCE TIMEOUTS?
1782  007524  046114  053517  047111
1783  007532  020107  051101  020105
1784  007540  040520  027522  042120
1785  007546  020122  042522  042506
1786  007554  042522  041516  020105
1787  007562  044524  042515  052517
1788  007570  051524     000
1789  007573     124  042510  043040  EM202:  .ASCIZ  ?THE FOLLOWING ARE DUAL ADDRESSING ERRORS FOR PAR'S/PDR'S?
1790  007600  046117  047514  044527
1791  007606  043516  040440  042522
1792  007614  042040  040525  020114
1793  007622  042101  051104  051505
1794  007630  044523  043516  042440
1795  007636  051122  051117  020123
1796  007644  047506  020122  040520
1797  007652  023522  027523  042120
1798  007660  023522  000123
1799  007664  044124  020105  047506  EM203:  .ASCIZ  ?THE FOLLOWING ARE COUNT PATTERN ERRORS FOR PAR'S/PDR'S?
1800  007672  046114  053517  047111
1801  007700  020107  051101  020105
1802  007706  047503  047125  020124
1803  007714  040520  052124  051105
1804  007722  020116  051105  047522
1805  007730  051522  043040  051117
1806  007736  050040  051101  051447
1807  007744  050057  051104  051447
1808  007752     000
1809
1810
1811  007753     124  051505  047124  DH1:    .ASCII  ?TESTNO  PC AT ABORT?
1812  007760  020117  050040  020103
1813  007766  052101  040440  047502
1814  007774  052122
1815  007776  050103  020125  051105  DH2:    .ASCIZ  ?CPU ERR TESTNO  PC AT ABORT?
1816  010004  020122  042524  052123
1817  010012  047516  020040  041520
1818  010020  040440  020124  041101
1819  010026  051117  000124
1820  010032  042515  020115  051105  DH3:    .ASCII  ?MEM ERR CONTROL HITMISS  ?<CRLF>
1821  010040  020122  047503  052116
1822  010046  047522  020114  044510
1823  010054  046524  051511  020123
1824  010062  100040
1825  010064  042522  044507  052123          .ASCIZ  ?REGISTR REGISTR REGISTR TESTNO  PC AT ABORT?
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1826  010072  020122  042522  044507
1827  010100  052123  020122  042522
1828  010106  044507  052123  020122
1829  010114  042524  052123  047516
1830  010122  020040  041520  040440
1831  010130  020124  041101  051117
1832  010136  000124
1833  010140  051105  047522  020122  DH5:    .ASCII  ?ERROR   VIRTUAL?<CRLF>
1834  010146  020040  044526  052122
1835  010154  040525  100114
1836  010160  042522  044507  052123          .ASCIZ  ?REGISTR ADDRESS TESTNO  PC AT ABORT?
1837  010166  020122  042101  051104
1838  010174  051505  020123  042524
1839  010202  052123  047516  020040
1840  010210  041520  040440  020124
1841  010216  041101  051117  000124
1842  010224  054105  042520  052103  DH6:    .ASCII  ?EXPECTD ERROR   VIRTUAL?<CRLF>
1843  010232  020104  051105  047522
1844  010240  020122  020040  044526
1845  010246  052122  040525  100114
1846  010254  047503  042116  052111          .ASCIZ  ?CONDITN REGISTR ADDRESS TESTNO  PC AT ABORT?
1847  010262  020116  042522  044507
1848  010270  052123  020122  042101
1849  010276  051104  051505  020123
1850  010304  042524  052123  047516
1851  010312  020040  041520  040440
1852  010320  020124  041101  051117
1853  010326  000124
1854  010330  046450  051115  024460  DH7:    .ASCIZ  ?(MMR0)  TESTNO  ERRORPC?
1855  010336  020040  042524  052123
1856  010344  047516  020040  051105
1857  010352  047522  050122  000103
1858  010360  047514  042101  042105  DH11:   .ASCIZ  ?LOADED  RECEIVD TESTNO  ERRORPC?
1859  010366  020040  042522  042503
1860  010374  053111  020104  042524
1861  010402  052123  047516  020040
1862  010410  051105  047522  050122
1863  010416  000103
1864  010420  054105  042520  052103  DH12:   .ASCIZ  ?EXPECTD (MMR2)  TESTNO  ERRORPC?
1865  010426  020104  046450  051115
1866  010434  024462  020040  042524
1867  010442  052123  047516  020040
1868  010450  051105  047522  050122
1869  010456  000103
1870  010460  042101  051104  051117  DH13:   .ASCIZ  ?ADDROR  ADDRAND TESTNO  ERRORPC  #ERRORS?
1871  010466  020040  042101  051104
1872  010474  047101  020104  042524
1873  010502  052123  047516  020040
1874  010510  051105  047522  050122
1875  010516  020103  021440  051105
1876  010524  047522  051522     000
1877  010531     101  042104  042522  DH14:   .ASCIZ  ?ADDRESS DATA    TESTNO  ERRORPC?
1878  010536  051523  042040  052101
1879  010544  020101  020040  052040
1880  010552  051505  047124  020117
1881  010560  042440  051122  051117
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1882  010566  041520     000
1883  010571     101  042104  047522  DH15:   .ASCII  ?ADDROR  ADDRAND ADDROR  ADDRAND?<CRLF>
1884  010576  020122  040440  042104
1885  010604  040522  042116  040440
1886  010612  042104  047522  020122
1887  010620  040440  042104  040522
1888  010626  042116     200
1889  010631     114  040517  042504          .ASCIZ  ?LOADED  LOADED  ENABLED ENABLED TESTNO ERRORPC #ERRORS?
1890  010636  020104  046040  040517
1891  010644  042504  020104  042440
1892  010652  040516  046102  042105
1893  010660  042440  040516  046102
1894  010666  042105  052040  051505
1895  010674  047124  020117  051105
1896  010702  047522  050122  020103
1897  010710  042443  051122  051117
1898  010716  000123
1899  010720  042101  051104  051117  DH16:   .ASCIZ  ?ADDROR  ADDRAND PATRNOR PATRNAD DATAOR  DATAND  TESTNO ERRORPC #ERRORS?
1900  010726  020040  042101  051104
1901  010734  047101  020104  040520
1902  010742  051124  047516  020122
1903  010750  040520  051124  040516
1904  010756  020104  040504  040524
1905  010764  051117  020040  040504
1906  010772  040524  042116  020040
1907  011000  042524  052123  047516
1908  011006  042440  051122  051117
1909  011014  041520  021440  051105
1910  011022  047522  051522     000
1911  011027     101  042104  042522  DH17:   .ASCIZ  ?ADDRESS EXPECTD RECEIVD TESTNO  ERRORPC?
1912  011034  051523  042440  050130
1913  011042  041505  042124  051040
1914  011050  041505  044505  042126
1915  011056  052040  051505  047124
1916  011064  020117  042440  051122
1917  011072  051117  041520     000
1918  011077     122  043505  042101  DH20:   .ASCIZ  ?REGADDR TESTNO  ERRORPC?
1919  011104  051104  052040  051505
1920  011112  047124  020117  042440
1921  011120  051122  051117  041520
1922  011126     000
1923  011127     122  043505  042101  DH21:   .ASCIZ  ?REGADDR DATA    TESTNO  ERRORPC?
1924  011134  051104  042040  052101
1925  011142  020101  020040  052040
1926  011150  051505  047124  020117
1927  011156  042440  051122  051117
1928  011164  041520     000
1929  011167     122  043505  042101  DH22:   .ASCIZ  ?REGADR  EXPECTD RECEIVD TESTNO ERRORPC?
1930  011174  020122  042440  050130
1931  011202  041505  042124  051040
1932  011210  041505  044505  042126
1933  011216  052040  051505  047124
1934  011224  020117  051105  047522
1935  011232  050122  000103
1936  011236  042522  040507  042104  DH23:   .ASCIZ  ?REGADDR DATAREC DATAEXP TESTNO  ERRORPC?
1937  011244  020122  040504  040524
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1938  011252  042522  020103  040504
1939  011260  040524  054105  020120
1940  011266  042524  052123  047516
1941  011274  020040  051105  047522
1942  011302  050122  000103
1943  011306  051513  020120  020040  DH27:   .ASCIZ  ?KSP     TESTNO  ERRORPC?
1944  011314  020040  042524  052123
1945  011322  047516  020040  051105
1946  011330  047522  050122  000103
1947  011336  047111  042504  020130  DH30:   .ASCII  ?INDEX   INDEX   PAR/PDR?<CRLF>
1948  011344  020040  047111  042504
1949  011352  020130  020040  040520
1950  011360  027522  042120  100122
1951  011366  054105  042520  052103          .ASCIZ  ?EXPECTD RECEIVD ADRREAD TESTNO  ERRORPC?
1952  011374  020104  042522  042503
1953  011402  053111  020104  042101
1954  011410  051122  040505  020104
1955  011416  042524  052123  047516
1956  011424  020040  051105  047522
1957  011432  050122  000103
1958  011436  044526  052122  040525  DH31:   .ASCII  ?VIRTUAL         PHYSCAL DATA    DATA?<CRLF>
1959  011444  020114  020040  020040
1960  011452  020040  020040  044120
1961  011460  051531  040503  020114
1962  011466  040504  040524  020040
1963  011474  020040  040504  040524
1964  011502     200
1965  011503     101  042104  042522          .ASCIZ  ?ADDRESS KIPAR4  ADDRESS EXPECTD RECEIVD TESTNO ERRORPC?
1966  011510  051523  045440  050111
1967  011516  051101  020064  040440
1968  011524  042104  042522  051523
1969  011532  042440  050130  041505
1970  011540  042124  051040  041505
1971  011546  044505  042126  052040
1972  011554  051505  047124  020117
1973  011562  051105  047522  050122
1974  011570  000103
1975  011572  052123  052122  042101  DH32:   .ASCIZ  ?STRTADR FNSHADR TESTNO  ERRORPC?
1976  011600  020122  047106  044123
1977  011606  042101  020122  042524
1978  011614  052123  047516  020040
1979  011622  051105  047522  050122
1980  011630  000103
1981  011632  040520  052124  051105  DH33:   .ASCII  ?PATTERN DATA    ADDRESS?<CRLF>
1982  011640  020116  040504  040524
1983  011646  020040  020040  042101
1984  011654  051104  051505  100123
1985  011662  047514  042101  042105          .ASCIZ  ?LOADED  FETCHED INTENDD KIPAR4  KIPAR5  TESTNO  ERRORPC?
1986  011670  020040  042506  041524
1987  011676  042510  020104  047111
1988  011704  042524  042116  020104
1989  011712  044513  040520  032122
1990  011720  020040  044513  040520
1991  011726  032522  020040  042524
1992  011734  052123  047516  020040
1993  011742  051105  047522  050122
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 1994  011750  000103
 1995  011752  040504  040524  020040  DH34:   .ASCIZ  ?DATA    TESTNO  ERRORPC?
 1996  011760  020040  042524  052123
 1997  011766  047516  020040  051105
 1998  011774  047522  050122  000103
 1999  012002  043520  042514  043116  DH35:   .ASCIZ  ?PGLENFD VABLKNO TESTNO  ERRORPC?
 2000  012010  020104  040526  046102
 2001  012016  047113  020117  042524
 2002  012024  052123  047516  020040
 2003  012032  051105  047522  050122
 2004  012040  000103
 2005  012042  044513  042120  032522  DH37:   .ASCIZ  ?KIPDR5  KIPAR5  VIRTADR TESTNO  ERRORPC?
 2006  012050  020040  044513  040520
 2007  012056  032522  020040  044526
 2008  012064  052122  042101  020122
 2009  012072  042524  052123  047516
 2010  012100  020040  051105  047522
 2011  012106  050122  000103
 2012  012112  044513  042120  032122  DH40:   .ASCIZ  ?KIPDR4  KIPAR4  VIRTADR TESTNO  ERRORPC?
 2013  012120  020040  044513  040520
 2014  012126  032122  020040  044526
 2015  012134  052122  042101  020122
 2016  012142  042524  052123  047516
 2017  012150  020040  051105  047522
 2018  012156  050122  000103
 2019  012162  052123  050113  051124  DH41:   .ASCIZ  ?STKPTR  STKLMT  TESTNO  ERRORPC?
 2020  012170  020040  052123  046113
 2021  012176  052115  020040  042524
 2022  012204  052123  047516  020040
 2023  012212  051105  047522  050122
 2024  012220  000103
 2025  012222  051520  004527  051411  DH47:   .ASCII  ?PSW            STK PTR (MMR0)  (MMR2)  TESTNO  ERRORPC?<CRLF>
 2026  012230  045524  050040  051124
 2027  012236  024040  046515  030122
 2028  012244  020051  024040  046515
 2029  012252  031122  020051  052040
 2030  012260  051505  047124  020117
 2031  012266  042440  051122  051117
 2032  012274  041520     200
 2033  012277     061  030064  030460          .ASCII  ?140017 -11/6X- 000000  020151?<CRLF>
 2034  012304  020067  030455  027461
 2035  012312  054066  004455  030060
 2036  012320  030060  030060  020040
 2037  012326  031060  030460  030465
 2038  012334     200
 2039  012335     061  030064  030060          .ASCII  ?140000 -11/40- 4&1074?<CRLF>
 2040  012342  020060  030455  027461
 2041  012350  030064  020055  023064
 2042  012356  030061  032067     200
 2043  012363     122  041505  044505          .ASCII  ?RECEIVED:?<CRLF>
 2044  012370  042526  035104     200
 2045  012375     120  053523  020040          .ASCIZ  ?PSW     PC      STK PTR (MMR0)  (MMR2)  TESTNO  ERRORPC?
 2046  012402  020040  050040  020103
 2047  012410  020040  020040  051440
 2048  012416  045524  050040  051124
 2049  012424  024040  046515  030122
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2050  012432  020051  024040  046515
2051  012440  031122  020051  052040
2052  012446  051505  047124  020117
2053  012454  042440  051122  051117
2054  012462  041520  000
2055  012465  117     044522  044507  DH50:   .ASCII  ?ORIGINAL DATA          NEW DATA?<CRLF>
2056  012472  040516  020114  040504
2057  012500  040524  004411  047040
2058  012506  053505  042040  052101
2059  012514  100101
2060  012516  046450  051115  024460          .ASCIZ  ?(MMR0)  (MMR2)  (MMR0)  (MMR2)  TESTNO  ERRORPC?
2061  012524  020040  046450  051115
2062  012532  024462  020040  046450
2063  012540  051115  024460  020040
2064  012546  046450  051115  024462
2065  012554  020040  042524  052123
2066  012562  047516  020040  051105
2067  012570  047522  050122  000103
2068  012576  042522  042503  053111  DH52:   .ASCIZ  ?RECEIVD (MMR2)  TESTNO  ERRORPC?
2069  012604  020104  046450  051115
2070  012612  024462  020040  042524
2071  012620  052123  047516  020040
2072  012626  051105  047522  050122
2073  012634  000103
2074  012636  044526  052122  042101  DH53:   .ASCIZ  ?VIRTADR (MMR2)  TESTNO  ERRORPC?
2075  012644  020122  046450  051115
2076  012652  024462  020040  042524
2077  012660  052123  047516  020040
2078  012666  051105  047522  050122
2079  012674  000103
2080  012676  054105  042520  052103  DH54:   .ASCIZ  ?EXPECTD (MMR0)  TESTNO  ERRORPC?
2081  012704  020104  046450  051115
2082  012712  024460  020040  042524
2083  012720  052123  047516  020040
2084  012726  051105  047522  050122
2085  012734  000103
2086  012736  044513  042120  032122  DH55:   .ASCIZ  ?KIPDR4  TESTNO  ERRORPC?
2087  012744  020040  042524  052123
2088  012752  047516  020040  051105
2089  012760  047522  050122  000103
2090  012766  044513  042120  033522  DH60:   .ASCIZ  ?KIPDR7  TESTNO  ERRORPC?
2091  012774  020040  042524  052123
2092  013002  047516  020040  051105
2093  013010  047522  050122  000103
2094  013016  042107  040520  042507  DH62:   .ASCIZ  ?GDPAGE  BDPAGE  TESTNO  ERRORPC?
2095  013024  020040  042102  040520
2096  013032  042507  020040  042524
2097  013040  052123  047516  020040
2098  013046  051105  047522  050122
2099  013054  000103
2100  013056  051524  050124  043501  DH63:   .ASCIZ  ?TSTPAGE CONTENT TESTNO  ERRORPC?
2101  013064  020105  047503  052116
2102  013072  047105  020124  042524
2103  013100  052123  047516  020040
2104  013106  051105  047522  050122
2105  013114  000103
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2106  013116  054105  042520  052103  DH64:   .ASCIZ  ?EXPECTD RECEIVD TESTNO  ERRORPC?
2107  013124  020104  042522  042503
2108  013132  053111  020104  042524
2109  013140  052123  047516  020040
2110  013146  051105  047522  050122
2111  013154  000103
2112  013156  054105  042520  052103  DH66:   .ASCIZ  ?EXFECTD RECEIVD TESTNO  ERRORPC?
2113  013164  020104  042522  042503
2114  013172  053111  020104  042524
2115  013200  052123  047516  020040
2116  013206  051105  047522  050122
2117  013214  000103
2118  013216  046450  051115  024460  DH67:   .ASCIZ  ?(MMR0)  (MMR2)  TESTNO  ERRORPC?
2119  013224  020040  046450  051115
2120  013232  024462  020040  042524
2121  013240  052123  047516  020040
2122  013246  051105  047522  050122
2123  013254  000103
2124  013256  052123  050113  051124  DH70:   .ASCIZ  ?STKPTR  TESTNO  ERRORPC?
2125  013264  020040  042524  052123
2126  013272  047516  020040  051105
2127  013300  047522  050122  000103
2128  013306  042107  040504  040524  DH71:   .ASCIZ  ?GDDATA  STORED  TESTNO  ERRORPC?
2129  013314  020040  052123  051117
2130  013322  042105  020040  042524
2131  013330  052123  047516  020040
2132  013336  051105  047522  050122
2133  013344  000103
2134  013346  050050  053523  020051  DH72:   .ASCIZ  ?(PSW)   TESTNO  ERRORPC EXPECTING XXX340?
2135  013354  020040  042524  052123
2136  013362  047516  020040  051105
2137  013370  047522  050122  020103
2138  013376  054105  042520  052103
2139  013404  047111  020107  054130
2140  013412  031530  030064     000
2141  013417     050  051520  024527  DH73:   .ASCIZ  ?(PSW)   TESTNO  ERRORPC?
2142  013424  020040  052040  051505
2143  013432  047124  020117  042440
2144  013440  051122  051117  041520
2145  013446     000
2146  013447     124  051505  047124  DH74:   .ASCIZ  ?TESTNO ERRORPC?
2147  013454  020117  051105  047522
2148  013462  050122  000103
2149  013466  052123  050113  051124  DH75:   .ASCIZ  ?STkPTR  STKLMT  CPUERR  TESTNO  ERRORPC?
2150  013474  020040  052123  046113
2151  013502  052115  020040  050103
2152  013510  042525  051122  020040
2153  013516  042524  052123  047516
2154  013524  020040  051105  047522
2155  013532  050122  000103
2156
2157
2158  013536  042101  051104  051505  DH201:  .ASCIZ  ?ADDRESS TESTNO ERRORPC?
2159  013544  020123  042524  052123
2160  013552  047516  042440  051122
2161  013560  051117  041520     000
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2162  013565  101     042104  042522  DH202:  .ASCII  ?ADDRESS ADDRESS?<CRLF>
2163  013572  051523  040440  042104
2164  013600  042522  051523  200
2165  013605  114     040517  042504          .ASCIZ  ?LOADED  JUSTREAD TESTNO ERRORPC?
2166  013612  020104  045040  051525
2167  013620  051124  040505  020104
2168  013626  042524  052123  047516
2169  013634  042440  051122  051117
2170  013642  041520  000
2171  013645  101     042104  042522  DH203:  .ASCIZ  ?ADDRESS RECEIVD EXPECTD COUNT   TESTNO ERRORPC?
2172  013652  051523  051040  041505
2173  013660  044505  042126  042440
2174  013666  050130  041505  042124
2175  013674  041440  052517  052116
2176  013702  020040  052040  051505
2177  013710  047124  020117  051105
2178  013716  047522  050122  000103
2179                                  .EVEN
2180
2181
2182  013724  001412  001410  000000  DT1:    .WORD   TESTNO,BADPC,0
2183  013732  001406  001412  001410  DT2:    .WORD   PCPUER,TESTNO,BADPC,0
2184  013740  000000
2185  013742  001374  001376  001400  DT3:    .WORD   PPARER,PCONTR,PHITMI,TESTNO,BADPC,0
2186  013750  001412  001410  000000
2187  013756  001402  001404  001412  DT5:    .WORD   PMMR0,PMMR2,TESTNO,BADPC,0
2188  013764  001410  000000
2189  013770  001364  001402  001404  DT6:    .WORD   MMEXP,PMMR0,PMMR2,TESTNO,BADPC,0
2190  013776  001412  001410  000000
2191  014004  001164  001412  001116  DT7:    .WORD   $REG1,TESTNO,$ERRPC,0
2192  014012  000000
2193  014014  001166  001164  001412  DT11:   .WORD   $REG2,$REG1,TESTNO,$ERRPC,0
2194  014022  001116  000000
2195  014026  001170  001166  001412  DT12:   .WORD   $REG3,$REG2,TESTNO,$ERRPC,0
2196  014034  001116  000000
2197  014040  001424  001426  001412  DT13:   .WORD   ADDROR,ADRAND,TESTNO,$ERRPC,$TMP5,0
2198  014046  001116  001210  000000
2199  014054  001162  001166  001412  DT14:   .WORD   $REG0,$REG2,TESTNO,$ERRPC,0
2200  014062  001116  000000
2201  014066  001424  001426  001414  DT15:   .WORD   ADDROR,ADRAND,DATAOR,DATAND,TESTNO,$ERRPC,$TMP5,0
2202  014074  001416  001412  001116
2203  014102  001210  000000
2204  014106  001424  001426  001420  DT16:   .WORD   ADDROR,ADRAND,PATTOR,PATAND,DATAOR,DATAND,TESTNO,$ERRPC,$TMP5,0
2205  014114  001422  001414  001416
2206  014122  001412  001116  001210
2207  014130  000000
2208  014132  001162  001166  001164  DT17:   .WORD   $REG0,$REG2,$REG1,TESTNO,$ERRPC,0
2209  014140  001412  001116  000000
2210  014146  001162  001412  001116  DT20:   .WORD   $REG0,TESTNO,$ERRPC,0
2211  014154  000000
2212  014156  001162  001164  001412  DT21:   .WORD   $REG0,$REG1,TESTNO,$ERRPC,0
2213  014164  001116  000000
2214  014170  001206  001210  001162  DT22:   .WORD   $TMP4,$TMP5,$REG0,TESTNO,$ERRPC,0
2215  014176  001412  001116  000000
2216  014204  001162  001164  001166  DT23:   .WORD   $REG0,$REG1,$REG2,TESTNO.$ERRPC,0
2217  014212  001412  001116  000000
```

```
2218  014220  001162  001412  001116  DT27:   .WORD   $REG0,TESTNO,$ERRPC,0
2219  014226  000000
2220  014230  001162  001164  001166  DT30:   .WORD   $REG0,$PEG1,$REG2,TESTNO,$ERRPC,0
2221  014236  001412  001116  000000
2222  014244  001162  001200  001202  DT31:   .WORD   $REG0,$TMP1,$TMP2,$REG1,$REG2,TESTNO,$ERRPC,0
2223  014252  001164  001166  001412
2224  014260  001116  000000
2225  014264  001200  001202  001412  DT32:   .WORD   $TMP1,$TMP2,TESTNO,$ERRPC,0
2226  014272  001116  000000
2227  014276  001166  001170  001162  DT33:   .WORD   $REG2,$REG3,$REG0,$TMP3,$TMP4,TESTNO,$ERRPC,0
2228  014304  001204  001206  001412
2229  014312  001116  000000
2230  014316  001164  001412  001116  DT34:   .WORD   $REG1,TESTNO,$ERRPC,0
2231  014324  000000
2232  014326  001164  001170  001412  DT35:   .WORD   $REG1,$REG3,TESTNO,$ERRPC,0
2233  014334  001116  000000
2234  014340  001176  001200  001202  DT37:   .WORD   $TMP0,$TMP1,$TMP2,TESTNO,$ERRPC,0
2235  014346  001412  001116  000000
2236  014354  001166  001170  001412  DT41:   .WORD   $REG2,$REG3,TESTNO,$ERRPC,0
2237  014362  001116  000000
2238  014366  001166  001170  001164  DT47:   .WORD   $REG2,$REG3,$REG1,PMMR0,PMMR2,TESTNO,$ERRPC,0
2239  014374  001402  001404  001412
2240  014402  001116  000000
2241  014406  001402  001404  001176  DT50:   .WORD   PMMR0,PMMR2,$TMP0,$TMP2,TESTNO,$ERRPC,0
2242  014414  001202  001412  001116
2243  014422  000000
2244  014424  001402  001404  001412  DT52:   .WORD   PMMR0,PMMR2,TESTNO,$ERRPC,0
2245  014432  001116  000000
2246  014436  001164  001404  001412  DT53:   .WORD   $REG1,PMMR2,TESTNO,$ERRPC,0
2247  014444  001116  000000
2248  014450  001166  001402  001412  DT54:   .WORD   $REG2,PMMR0,TESTNO,$ERRPC,0
2249  014456  001116  000000
2250  014462  001176  001412  001116  DT55:   .WORD   $TMP0,TESTNO,$ERRPC,0
2251  014470  000000
2252  014472  001170  001164  001412  DT62:   .WORD   $REG3,$REG1,TESTNO,$ERRPC,0
2253  014500  001116  000000
2254  014504  001170  001162  001412  DT63:   .WORD   $REG3,$REG0,TESTNO,$ERRPC,0
2255  014512  001116  000000
2256  014516  001166  001164  001412  DT64:   .WORD   $REG2,$REG1,TESTNO,$ERR0RPC,0
2257  014524  043352  000000
2258  014530  001162  001164  001412  DT66:   .WORD   $REG0,$REG1,TESTNO,$ERRPC,0
2259  014536  001116  000000
2260  014542  001402  001404  001412  DT67:   .WORD   PMMR0,PMMR2,TESTNO,$ERRPC,0
2261  014550  001116  000000
2262  014554  001164  001412  001116  DT70:   .WORD   $REG1,TESTNO.$ERRPC,0
2263  014562  000000
2264  014564  001162  001412  001116  DT72:   .WORD   $REG0,TESTNO,$ERRPC,0
2265  014572  000000
2266  014574  001412  001116  000000  DT74:   .WORD   TESTNO,$ERRPC,0
2267  014602  001166  001170  001406  DT75:   .WORD   $REG2,$REG3,PCPUER,TESTNO,$ERRPC,0
2268  014610  001412  001116  000000
2269
2270  014616  001162  001412  001116  DT201:  .WORD   $REG0,TESTNO,$ERRPC.0
2271  014624  000000
2272  014626  001162  001164  001412  DT202:  .WORD   $REG0,$REG1,TESTNO,$ERRPC.0
2273  014634  001116  000000
```

```
2274  014640  001162  001166  001172  DT203:  .WORD   $REG0,$REG2,$REG4,$REG1,TESTNO,$ERRPC,0
2275  014646  001164  001412  001116
2276  014654  000000
2277
2278
2279  014656      000     000         DF1:    .BYTE   0,0
2280  014660      000     000     000 DF2:    .BYTE   0,0,0
2281  014663      000     000     000 DF3:    .BYTE   0,0,0,0,0
2282  014666      000     000
2283  014670      000     000     000 DF5:    .BYTE   0,0,0,0
2284  014673      000
2285  014674      000     000     000 DF6:    .BYTE   0,0,0,0,0
2286  014677      000     000
2287  014701      000     000     000 DF7:    .BYTE   0,0,0
2288  014704      000     000     000 DF11:   .BYTE   0,0,0,0
2289  014707      000
2290  014710      000     000     000 DF12:   .BYTE   0,0,0,0
2291  014713      000
2292  014714      000     000     000 DF13:   .BYTE   0,0,0,0,1
2293  014717      000     001
2294  014721      000     000     000 DF14:   .BYTE   0,0,0,0
2295  014724      000
2296  014725      000     000     000 DF15:   .BYTE   0,0,0,0,0,0,1
2297  014730      000     000     000
2298  014733      001
2299  014734      000     000     000 DF16:   .BYTE   0,0,0,0,0,0,0,0,1
2300  014737      000     000     000
2301  014742      000     000     001
2302  014745      000     000     000 DF17:   .BYTE   0,0,0,0,0
2303  014750      000     000
2304  014752      000     000     000 DF20:   .BYTE   0,0,0
2305  014755      000     000     000 DF21:   .BYTE   0,0,0,0
2306  014760      000
2307  014761      000     000     000 DF22:   .BYTE   0,0,0,0,0
2308  014764      000     000
2309  014766      000     000     000 DF23:   .BYTE   0,0,0,0,0
2310  014771      000     000
2311  014773      000     000     000 DF27:   .BYTE   0,0,0
2312  014776      000     000     000 DF30:   .BYTE   0,0,0,0,0
2313  015001      000     000
2314  015003      000     000     000 DF31:   .BYTE   0,0,0,0,0,0,0
2315  015006      000     000     000
2316  015011      000
2317  015012      002     002     000 DF32:   .BYTE   2,2,0,0
2318  015015      000
2319  015016      000     000     000 DF33:   .BYTE   0,0,0,0,0,0,0
2320  015021      000     000     000
2321  015024      000
2322  015025      000     000     000 DF34:   .BYTE   0,0,0
2323  015030      000     000     000 DF35:   .BYTE   0,0,0,0
2324  015033      000
2325  015034      000     000     000 DF37:   .BYTE   0,0,0,0,0
2326  015037      000     000
2327  015041      000     000     000 DF41:   .BYTE   0,0,0,0
2328  015044      000
2329  015045      000     000     000 DF47:   .BYTE   0,0,0,0,0,0,0
```

```
2330  015050  000  000  000
2331  015053  000
2332  015054  000  000  000  DF50:   .BYTE   0,0,0,0,0,0
2333  015057  000  000  000
2334  015062  000  000  000  DF52:   .BYTE   0,0,0,0
2335  015065  000
2336  015066  000  000  000  DF53:   .BYTE   0,0,0,0
2337  015071  000
2338  015072  000  000  000  DF54:   .BYTE   0,0,0,0
2339  015075  000
2340  015076  000  000  000  DF55:   .BYTE   0,0,0
2341  015101  000  000  000  DF62:   .BYTE   0,0,0,0
2342  015104  000
2343  015105  000  000  000  DF63:   .BYTE   0,0,0,0
2344  015110  000
2345  015111  000  000  000  DF64:   .BYTE   0,0,0,0
2346  015114  000
2347  015115  000  000  000  DF66:   .BYTE   0,0,0,0
2348  015120  000
2349  015121  000  000  000  DF67:   .BYTE   0,0,0,0
2350  015124  000
2351  015125  000  000  000  DF70:   .BYTE   0,0,0
2352  015130  000  000  000  DF72:   .BYTE   0,0,0
2353  015133  000  000       DF74:   .BYTE   0,0
2354  015135  000  000  000  DF75:   .BYTE   0,0,0,0,0
2355  015140  000  000
2356
2357
2358
2359  015142  000  000  000  DF201:  .BYTE   0,0,0
2360  015145  000  000  000  DF202:  .BYTE   0,0,0,0
2361  015150  000
2362  015151  000  000  000  DF203:  .BYTE   0,0,0,0,0,0
2363  015154  000  000  000
2364          015160                       .EVEN
2365
2366
2367
2368
2369
```

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

                                .SBTTL  CPU TRAP HANDLER ROUTINE
                                ;;**************************************************************************
                                ;*
                                ;*      THIS SUBROUTINE WILL HANDLE ALL CPU TRAPS AND ABORTS, THRU
                                ;*      "ERRVEC" (000004).  IF THIS SUBROUTINE IS ENTERED BY A SECOND
                                ;*      TRAP BEFORE THE FIRST HAS BEEN PROCESSED A HALT IS EXECUTED.
                                ;*      THE CPU ERROR REGISTER IS READ IF EXECUTING ON AN 11/6X.
                                ;*      FOR EVERY CASE AN ERROR MESSAGE IS TYPED REPORTING AN
                                ;*      UNEXPECTED TRAP OR ABORT TO LOC 4.  'PCPUER' CAN
                                ;*      BE USED AS A FLAG TO INDICATE THAT A TRAP HAS OCCURRED SINCE IT
                                ;*      IS LOADED WITH THE ERROR REGISTER IF A TRAP VECTORS HERE
                                ;*
                                ;;**************************************************************************
015160  005227          CPUER:  INC     (PC)+                   ;MAKE FLAG ZERO IF FIRST TIME
015162  177777          CPFLAG: .WORD   -1                      ;NEGATIVE ONE FOR A FLAG
015164  001401                  BEQ     10$                     ;BRANCH IF FIRST TIME IN
015166  000000                  HALT                            ;I HAVE ENTERED THIS ROUTINE BEFORE
                                                                ;I FINISHED REPORTING THE FIRST ERROR
                                                                ;THE SECOND ENTRY ADDRESS IS ON THE
                                                                ;STACK AND THE FIRST ERROR CONDITION
                                                                ;IS PROBABLY STILL LOCKED UP .
015170  012637  001434  10$:     MOV     (KSP)+,OLDPC            ;SAVE RETURN ADDRESS IN CASE OF LOOP
015174  012637  001436          MOV     (KSP)+,OLDPS            ;SAVE OLD PSW IN CASE OF LOOP
015200  013737  001434  001410  MOV     OLDPC,BADPC             ;SAVE PC+2 AT TIME OF ABORT
015206  105737  001446          TSTB    FORTY                   ;EXECUTING ON AN 11/40?
015212  001402                  BEQ     2$                      ;BRANCH IF NO
015214  104001                  ERROR   1                       ;UNEXPECTED CPU TRAP OR ABORT
015216  000404                  BR      1$                      ;BRANCH TO EXIT
015220  013737  177766  001406  2$:     MOV     @#CPUERR,PCPUER ;SAVE CPU ERROR REGISTER ON AN 11/6X
015226  104002                  ERROR   2                       ;UNEXPECTED CPU TRAP OR ABORT
015230  012737  177777  015162  1$:     MOV     #-1,CPFLAG      ;MAKE FLAG NEGATIVE ONE FOR NEXT TIME
015236  013746  001436          MOV     OLDPS,-(KSP)            ;PUSH OLD PSW BACK ON STACK
015242  013746  001434          MOV     OLDPC,-(KSP)            ;PUSH RETURN ADDRESS BACK ON STACK
015246  000006                  RTT                             ;RETURN FROM INTERRUPT OR ABORT


                                .SBTTL  MEMORY/CACHE PARITY TRAPS AND ABORTS HANDLER ROUTINE
                                ;;**************************************************************************
                                ;*
                                ;*      THIS SUBROUTINE WILL HANDLE ALL UNEXPECTED PARITY ERRORS.  IF
                                ;*      THE PARITY ERROR IS AN ABORT THE TEST THAT WAS RUNNING WILL
                                ;*      BE RESTARTED ONCE AFTER THE ABORT CONDITION IS REPORTED.  ON THE
                                ;*      SECOND ABORT IN A SINGLE TEST THE NEXT TEST IS ATTEMPTED
                                ;*      AFTER THE ABORT IS REPORTED.
                                ;*
                                ;;**************************************************************************
015250  005227          MEMER:  INC     (PC)+                   ;MAKE FLAG ZERO IF FIRST TIME
015252  177777          PAFLAG: .WORD   -1                      ;NEGATIVE ONE FOR A FLAG
015254  001401                  BEQ     10$                     ;BRANCH IF FIRST TIME IN
015256  000000                  HALT                            ;I HAVE ENTERED THIS ROUTINE BEFORE
                                                                ;I FINISHED REPORTING THE FIRST ERROR
```

```
2426                                                    ;THE SECOND ENTRY ADDRESS IS ON THE
2427                                                    ;STACK AND THE FIRST ERROR CONDITION
2428                                                    ;IS PROBABLY STILL LOCKED UP .
2429  015260  012637  001434          10$:    MOV     (KSP)+,OLDPC    ;SAVE RETURN ADDRESS IN CASE OF LOOP
2430  015264  012637  001436                  MOV     (KSP)+,OLDPS    ;SAVE OLD PSW IN CASE OF LOOP
2431  015270  105737  001446                  TSTB    FORTY           ;EXECUTING ON AN 11/40?
2432  015274  001026                          BNE     6$              ;BRANCH IF YES
2433  015276  017737  164054  001374          MOV     @MEMERR,PPARER  ;SAVE MEMORY ERROR REGISTER
2434  015304  017737  164042  001376          MOV     @CONTRL,PCONTR  ;SAVE CONTROL REGISTER FOR TYPE OUT
2435  015312  017737  164036  001400          MOV     @HITMIS,PHITMI  ;SAVE HIT/MISS REGISTER
2436  015320  013737  001434  001410          MOV     OLDPC,BADPC     ;SAVE PC+2 AT TIME OF ABORT
2437  015326  032777  000014  164016          BIT     #14,@CONTRL     ;SEE IF CACHE IS ON OR OFF
2438  015334  001010                          BNE     1$              ;IF OFF, MUST BE MEMORY REFERENCE
2439  015336  032777  000340  164030          BIT     #340,@PPARER    ;WAS THIS A CACHE PARITY ERROR
2440  015344  001004                          BNE     1$              ;BRANCH IF IT WAS A MAIN MEMORY ERROR
2441  015346  104003                          ERROR   3               ;UNEXPECTED CACHE PARITY ERROR
2442  015350  000403                          BR      2$              ;BRANCH TO EXIT POINT
2443  015352  104077                  6$:     ERROR   77              ;UNEXPECTED MAIN MEM. PARITY ERR.  11/40
2444  015354  000401                          BR      2$              ;BRANCH TO EXIT POINT
2445  015356  104004                  1$:     ERROR   4               ;UNEXPECTED MAIN MEMORY PARITY ERROR
2446  015360  005737  001442          2$:     TST     RETRY           ;ARE YOU RETRYING THIS TEST?
2447  015364  001006                          BNE     3$              ;BRANCH IF THIS IS SECOND TRY
2448  015366  005237  001442                  INC     RETRY           ;SET RETRY FLAG
2449  015372  013737  001106  001434          MOV     $LPADR,OLDPC    ;RETURN TO START OF THIS TEST
2450  015400  000403                          BR      4$              ;BRANCH TO EXIT
2451  015402  013737  001444  001434  3$:     MOV     NXTTST,OLDPC    ;RETURN TO START OF NEXT TEST
2452                                                    ;SINCE THIS IS THE SECOND ABORT
2453  015410  012737  177777  015252  4$:     MOV     #-1,PAFLAG      ;RESTORE A NEGATIVE ONE FOR NEXT TIME
2454  015416  013746  001436                  MOV     OLDPS,-(KSP)    ;PUSH OLD PSW BACK ON STACK
2455  015422  013746  001434                  MOV     OLDPC,-(KSP)    ;PUSH RETURN ADDRESS BACK ON STACK
2456  015426  000006                  5$:     RTT                     ;RETURN FROM INTERRUPT.
2457
2458
2459
2460                                            .SBTTL  MEMORY MANAGEMENT TRAPS AND ABORTS HANDLER ROUTINE
2461                                            ;;**************************************************************************
2462                                            ;*
2463                                            ;*      THIS SUBROUTINE WILL HANDLE MOST OF THE MEMORY MANAGEMENT TRAPS
2464                                            ;*      AND ABORTS THAT ARE GENERATED DURING THIS PROGRAM.  ANY M.M.
2465                                            ;*      ABORTS OR TRAPS THAT OCCUR WHILE 'MMEXP' IS ZERO ARE UNEXPECTED
2466                                            ;*      AND WILL BE REPORTED AS SUCH.  THIS MAY OCCUR BECAUSE SOME LOGIC
2467                                            ;*      THAT IS TO INHIBIT A TRAP HAS FAILED.
2468                                            ;*      THERE ARE ALSO TIMES WHEN I AM EXPECTING A CERTAIN CONDITION TO
2469                                            ;*      OCCUR, AND WHEN THIS CONDITION IN 'MMEXP' DOES NOT MATCH THE
2470                                            ;*      CONTENTS OF 'PMMR0' (SAME AS 'MMR0') AN ERROR IS REPORTED.
2471                                            ;*
2472                                            ;;**************************************************************************
2473  015430  005227                  MMTRAP: INC     (PC)+           ;MAKE FLAG ZERO IF FIRST TIME
2474  015432  177777                  MMFLAG: .WORD   -1              ;FLAG SHOULD BE NEG ONE
2475  015434  001401                          BEQ     10$             ;BRANCH IF FIRST TIME INTO ROUTINE
2476  015436  000000                          HALT                    ;I HAVE ENTERED THIS ROUTINE BEFORE
2477                                                                  ;I FINISHED REPORTING THE FIRST ERROR
2478                                                                  ;THE SECOND ENTRY ADDRESS IS ON THE
2479                                                                  ;STACK AND THE FIRST ERROR CONDITION
2480                                                                  ;IS PROBABLY STILL LOCKED UP .
2481  015440  011637  001410          10$:    MOV     (KSP),BADPC     ;SAVE PC AT TIME OF ABORT OR TRAP
```

```
                                                MOV     (KSP)+,OLDPC    ;SAVE RETURN ADDRESS IN CASE OF LOOP
                                                MOV     (KSP)+,OLDPS    ;SAVE OLD PSW IN CASE OF LOOP
                                                MOV     MMR0,PMMR0      ;SAVE STATUS REGISTER
                                                MOV     MMR2,PMMR2      ;SAVE VIRTUAL ADDRESS REGISTER
                                                TST     MMEXP           ;SEE IF ANY M.M. TRAPS WERE EXPECTED
                                                BNE     5$              ;BRANCH IF ONE WAS EXPECTED
                                                ERROR   5               ;UNEXPECTED M.M. ABORT OR TRAP
                                                BR      1$              ;BRANCH TO EXIT
                                        5$:     CMP     MMEXP,PMMR0     ;SEE IF ABORT OR TRAP WAS EXPECTED
                                                BEQ     1$              ;BRANCH IF CONDITION CORRECT
                                                ERROR   6               ;ERROR TYPE OUT ITEM 6
                                        1$:     BIC     #177376,@#MMR0  ;CLEAR ALL BITS EXCEPT 0 AND 8
                                                MOV     #-1,MMFLAG      ;RESTORE A NEGATIVE ONE TO FLAG
                                                MOV     OLDPS,-(KSP)    ;PUSH OLD PSW ONTO STACK
                                                MOV     OLDPC,-(KSP)    ;PUSH RETURN ADDRESS ON STACK
                                                RTT                     ;RETURN TO MAIN PROGRAM


                                .SBTTL  TRAP ROUTINES FOR ABORT IN USER MODE
                                ;;*****************************************************************
                                ;*
                                ;*      THESE NEXT THREE SUBROUTINES ARE USED FOR THE TESTS THAT VERIFY
                                ;*      THE VECTOR IS PICKED UP FROM KERNEL SPACE DURING AN ABORT.
                                ;*      'KERVEC' IS WHERE I SHOULD GO SINCE IT IS AT 250 WHICH IS
                                ;*              KERNEL SPACE VIRTUAL 250.
                                ;*      'USEVEC' IS AT 350 WHICH IS USER SPACE VIRTUAL 250
                                ;*
                                ;*      THEY BOTH READ THE PROCESSOR STATUS WHICH IS DIFFERENT FOR EACH
                                ;*      VECTOR AND THEN JUMP TO 'RDMMR0'.  'RDMMR0' READS MMR0
                                ;*      AND MMR2 AND RETURNS TO THE TEST WHERE THEY ARE TESTED.
                                ;*
                                ;;*****************************************************************
                        KERVEC: MOV     PSW,R0          ;PUT PROCESSOR STATUS INTO R0
                                MOV     (KSP)+,OLDPC    ;SAVE RETURN ADDRESS
                                MOV     (KSP)+,OLDPS    ;SAVE OLD PROCESSOR STATUS
                                CMPB    #340,R0         ;SEE IF CORRECT PSW WAS PICKED UP
                                BEQ     1$              ;BRANCH IF PSW IS CORRECT
                                ERROR   72              ;WRONG PSW PICKED UP
                        1$:     JMP     RDMMR0          ;JUMP TO READ MMR0

                        USEVEC: MOV     (KSP)+,OLDPC    ;SAVE RETURN ADDRESS
                                MOV     (KSP)+,OLDPS    ;SAVE OLD PROCESSOR STATUS
                                MOV     PSW,R0          ;READ PSW FOR ERROR PRINT OUT
                                ERROR   73              ;WRONG VECTOR, POSSIBLE WRONG PSW


                        RDMMR0: MOV     MMR0,PMMR0      ;READ MMR0 TO BE CHECKED LATER
                                MOV     MMR2,PMMR2      ;READ MMR2 FOR POSSIBLE ERROR REPORT
                                MOV     OLDPS,-(KSP)    ;PUSH OLD PROCESSOR STATUS ON STACK
                                MOV     OLDPC,-(KSP)    ;PUSH RETURN ADDRESS ON STACK
                                RTT                     ;RETURN TO TEST TO CHECK PMMR0
```

```
                                        .SBTTL
                                        .SBTTL  ************ ENTRY POINT 1 --- STARTING ADDRESS 200 ************
                                        .SBTTL  ********** TEST CODE STARTS AT ADDRESS 20000 (PAGE 1) **********
                020000                  .=20000

020000  012737  000000  001360  STRT1:  MOV     #0,FSTTST       ;LOAD INDEX TO START TABLE
020006  000427                  BR      START           ;BRANCH TO STARTING ADDRESS OF PROGRAM
020010  012737  000002  001360  STRT2:  MOV     #2,FSTTST       ;LOAD INDEX TO START TABLE
020016  000423                  BR      START           ;BRANCH TO STARTING ADDRESS OF PROGRAM
020020  012737  000004  001360  STRT3:  MOV     #4,FSTTST       ;LOAD INDEX TO START TABLE
020026  000417                  BR      START           ;BRANCH TO STARTING ADDRESS OF PROGRAM
020030  012737  000006  001360  STRT4:  MOV     #6,FSTTST       ;LOAD INDEX TO START TABLE
020036  000413                  BR      START           ;BRANCH TO STARTING ADDRESS OF PROGRAM
020040  012737  000010  001360  STRT5:  MOV     #10,FSTTST      ;LOAD INDEX TO START TABLE
020046  000407                  BR      START           ;BRANCH TO STARTING ADDRESS OF PROGRAM
020050  012737  000012  001360  STRT6:  MOV     #12,FSTTST      ;LOAD INDEX TO START TABLE
020056  000403                  BR      START           ;BRANCH TO STARTING ADDRESS OF PROGRAM
020060  012737  000014  001360  STRT7:  MOV     #14,FSTTST      ;LOAD INDEX TO START TABLE

                                        ;*      NOTE:   THE FIRST THING THAT IS DONE IS TO SEE IF THE
                                        ;*              11/40 OR THE 11/6X MEMORY MGMT. IS BEING TESTED
                                        ;*              AND IF ON AN 11/40 IF THERE IS A STACK LIMIT
                                        ;*              REGISTER.  THE 11/6X "MED" INSTRUCTION IS USED
                                        ;*              TO DETERMINE PROCESSOR TYPE AND THE STACK LIMIT
                                        ;*              REG. IS CHECKED FOR TIMEOUT.
                                        ;*
                                        ;*              IF A "MED" DOES NOT EXECUTE PROPERLY ON AN 11/6X
                                        ;*              OR IF THE STACK LIMIT REG. TIMES OUT ON AN 11/40 -
                                        ;*              ERRONEOUS DECISIONS WILL BE MADE DURING TESTING
                                        ;*              WHICH WILL RESULT IN INCOMPLETE TESTING.

020066  012706  001100          START:  MOV     #KERSTK,KSP     ;SETUP STACK POINTER
020072  012737  020112  000010          MOV     #1$,@#10        ;SETUP ILLEGAL INST. VECTOR
020100  105037  001446                  CLRB    FORTY           ;CLEAR 11/40 "FLAG LOC."
020104  076600                  MED                             ;TRY 11/6X INSTRUCTION
020106  000100                  RLJAM                           ;WILL TRAP TO 1$ IF ON AN 11/40
020110  000410                  BR      3$                      ;WILL BRANCH TO SETUP IF ON 11/6X
020112  062706  000004          1$:     ADD     #4,KSP          ;CLEAN UP STACK IF ON 11/40 AND
020116  105237  001446                  INCB    FORTY           ;SET 11/40 "FLAG LOC."
020122  012737  000012  000010          MOV     #12,@#10        ;RESTORE TRAP CATCHER TO LOC. 10
020130  000413                  BR      4$                      ;BRANCH TO SETUP
020132  012777  000014  161212  3$:     MOV     #14,@CONTRL     ;TURN 11/6X CACHE OFF FOR FIRST PASS
020140  052700  100001                  BIS     #100001,R0      ;XXXXXX
020144  076600                  MED
020146  000305                  WLWHAM
020150  052700  100001                  BIS     #100001,R0
020154  076600                  MED
020156  000222                  WWHAM
020160                          4$:
                                        .SBTTL  INITIALIZE THE COMMON TAGS
                                        ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
020160  012706  001100                  MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
020164  005026                  CLR     (R6)+           ;;CLEAR MEMORY LOCATION
020166  022706  001140                  CMP     #SWR,R6 ;;DONE?
020172  001374                  BNE     .-6             ;;LOOP BACK IF NO
```

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2591  020174  012706  001100                  MOV     #STACK,SP       ;;SETUP THE STACK POINTER
2592                                  ;;INITIALIZE A FEW VECTORS
2593  020200  012737  043056  000020          MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
2594  020206  012737  000340  000022          MOV     #340,@#IOTVEC+2 ;;LEVEL 7
2595  020214  012737  043352  000030          MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
2596  020222  012737  000340  000032          MOV     #340,@#EMTVEC+2 ;;LEVEL 7
2597  020230  012737  042412  000034          MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
2598  020236  012737  000340  000036          MOV     #340,@#TRAPVEC+2;LEVEL 7
2599  020244  012737  042472  000024          MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
2600  020252  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;LEVEL 7
2601  020260  013737  040662  040654          MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
2602  020266  005037  001212                  CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
2603  020272  005037  001214                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
2604  020276  112737  000001  001115          MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
2605                                  ;;INITIALIZE THE "T-BIT" TRAP VECTOR. THEN LOAD LOCATION "$RTRN", IN
2606                                  ;;THE "END-OF-PASS" ($EOP) ROUTINE, WITH A "RTI" OR "RTT".
2607  020304  012737  041100  000014          MOV     #$RTRN,@#TBITVEC ;;SET "T" BIT VECTOR TO $RTRN
2608  020312  012737  000340  000016          MOV     #340,@#TBITVEC+2 ;;LEVEL 7
2609  020320  012737  000002  041100          MOV     #RTI,$RTRN      ;;SET $RTRN TO A RTI
2610  020326  012737  020354  000010          MOV     #65$,@#RESVEC   ;;TRY TO DO A RTT
2611  020334  005046                          CLR     -(SP)           ;;DUMMY PS
2612  020336  012746  020344                  MOV     #64$,-(SP)      ;;AND PC
2613  020342  000006                          RTT                     ;;TRY THE RTT
2614  020344  012737  000006  041100  64$:    MOV     #RTT,$RTRN      ;;RTT IS LEGAL--SET $RTRN TO A RTT
2615  020352  000402                          BR      66$
2616  020354  062706  000010          65$:    ADD     #10,SP          ;;RTT ILLEGAL--CLEAN OFF THE STACK
2617  020360  012737  000012  000010  66$:    MOV     #RESVEC+2,@#RESVEC ;;RESTORE TRAP CATCHER
2618  020366  005037  041106                  CLR     $TBIT           ;;CLEAR "T" BIT SWITCH
2619  020372  012737  020372  001106          MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
2620  020400  012737  020400  001110          MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
2621                                  ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
2622                                  ;;EQUAL TO A "-1", SETUP FOR A SOFTWARE SWITCH REGISTER.
2623  020406  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
2624  020412  012737  020446  000004          MOV     #67$,@#ERRVEC   ;;SET UP ERROR VECTOR
2625  020420  012737  177570  001140          MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
2626  020426  012737  177570  001142          MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
2627  020434  022777  177777  160476          CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
2628  020442  001012                          BNE     69$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
2629                                                                  ;;AND  THE HARDWARE SWR IS NOT = -1
2630  020444  000403                          BR      68$             ;;BRANCH IF NO TIMEOUT
2631  020446  012716  020454          67$:    MOV     #68$,(SP)       ;;SET UP FOR TRAP RETURN
2632  020452  000002                          RTI
2633  020454  012737  000176  001140  68$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
2634  020462  012737  000174  001142          MOV     #DISPREG,DISPLAY
2635  020470  012637  000004          69$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
2636
2637  020474  005037  001234                  CLR     $PASS           ;;CLEAR PASS COUNT
2638  020500  132737  000200  001247          BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
2639  020506  001403                          BEQ     70$             ;;YES,USE NON-APT SWITCH
2640  020510  012737  001250  001140          MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
2641  020516                          70$:
2642                                  .SBTTL  TYPE PROGRAM NAME
2643                                  ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
2644  020516  005227  177777                  INC     #-1             ;;FIRST TIME?
2645  020522  001030                          BNE     71$             ;;BRANCH IF NO
2646  020524  022737  041034  000042          CMP     #$ENDAD,@#42    ;;ACT-11?
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2647  020532  001424                          BEQ     71$             ;;BRANCH IF YES
2648  020534  104401  020542                  TYPE    ,72$            ;;TYPE ASCIZ STRING
2649  020540  000421                          BR      71$             ;;GET OVER THE ASCIZ
2650                                  ;;72$:  .ASCIZ  <CRLF>?CQKTA-B0 11/6X MEM. MGMT. DIAG.?<CRLF>
2651  020604                          71$:
2652  020604  012737  020604  001110          MOV     #.,$LPERR       ;INITIALIZE LOOP ON ERROR PTR.
2653  020612  012737  020612  001106          MOV     #.,$LPADR       ;INITIALIZE LOOP ADDRESS PTR.
2654
2655
2656  020620  005737  001234          LOOP:   TST     $PASS           ;IS THIS THE FIRST PASS?
2657  020624  001406                          BEQ     5$              ;BRANCH IF FIRST PASS
2658  020626  105737  001446                  TSTB    FORTY           ;EXECUTING ON AN 11/40?
2659  020632  001003                          BNE     5$              ;BRANCH IF YES
2660  020634  012777  000200  160510          MOV     #200,@CONTRL    ;OTHERWISE TURN CACHE ON AND SET THE
2661                                                                  ;PARITY ABORT BIT
2662  020642  005037  177572          5$:     CLR     MMR0            ;GET INTO 16 BIT MODE ON SECOND PASS
2663  020646  004737  040570                  JSR     PC,CLRUW        ;INITIALIZE U REG'S
2664  020652  012700  177777                  MOV     #-1,R0          ;PUT NEG ONE IN R0 TO INITIALIZE FLAGS
2665  020656  010037  015162                  MOV     R0,CPFLAG       ;INITIALIZE CPU ERROR FLAG
2666  020662  010037  015252                  MOV     R0,PAFLAG       ;INITIALIZE PARITY ERROR FLAG
2667  020666  010037  015432                  MOV     R0,MMFLAG       ;INITIALIZE MEMORY MANAGEMENT TRAP FLAG
2668  020672  005037  001362                  CLR     CPUEXP          ;NOT EXPECTING ANY CPU TRAPS
2669  020676  005037  001364                  CLR     MMEXP           ;NOT EXPECTING ANY MEMORY MANAGEMENT TRAPS
2670  020702  012737  015160  000004          MOV     #CPUER,ERRVEC   ;LOAD ADDRESS OF CPU TRAP ROUTINE
2671  020710  012737  000340  000006          MOV     #340,ERRVEC+2   ;SET PRIORITY LEVEL 7
2672  020716  012737  015250  000114          MOV     #MEMER,CACHVEC  ;LOAD ADDRESS OF PARITY TRAP ROUTINE
2673  020724  012737  000340  000116          MOV     #340,CACHVEC+2  ;SET PRIORITY LEVEL 7
2674  020732  012737  015430  000250          MOV     #MMTRAP,MMVEC   ;LOAD ADDRESS OF MEMORY MANAGEMENT TRAP
2675  020740  012737  000340  000252          MOV     #340,MMVEC+2    ;SET PRIORITY LEVEL 7
2676  020746  004737  044254                  JSR     PC,CLEANUP      ;INITIALIZE ALL ERROR LOCATIONS
2677  020752  012706  001100                  MOV     #KERSTK,KSP     ;SET UP KERNEL STACK POINTER
2678  020756  013700  001360                  MOV     FSTTST,R0       ;LOAD START TABLE INDEX
2679  020762  001412                          BEQ     TST1            ;START WITH TEST ONE IF ZERO
2680  020764  012737  140000  177776          MOV     #140000,PSW     ;GO TO USER MODE
2681  020772  012706  000700                  MOV     #USESTK,USP     ;SET UP USER STACK POINTER
2682  020776  012737  000340  177776          MOV     #340,PSW        ;GO TO KERNEL MODE PRIORITY LEVEL 7
2683  021004  000170  001460                  JMP     @STRTAB(R0)     ;JUMP TO CORRECT ENTRY POINT
2684
2685
2686                                  ;*      THIS FIRST GROUP OF TESTS IS FOR TESTING THE ADDRESS DECODE
2687                                  ;*      LOGIC FOR THE INTERNAL REGISTERS AND TO MAKE SOME
2688                                  ;*      DETERMINATION ABOUT THE RESPONDING ADDRESSES.  IF AN
2689                                  ;*      ADDRESS DOES NOT FUNCTION AS THE CORRESPONDING REGISTER SHOULD
2690                                  ;*      AN ERROR WILL BE FLAGGED.  THE MULTIPLEXERS AND INTERNAL BUS
2691                                  ;*      DRIVERS ARE ALSO UTILIZED IN THESE TESTS AND COULD BE
2692                                  ;*      THE SOURCE OF ANY PROBLEMS ENCOUNTERED.
2693
2694
2695                                  ;;*****************************************************************
2696                                  ;*TEST 1         TRY TO READ ALL CPU REGISTERS
2697                                  ;*
2698                                  ;*      THIS TEST ENSURES THAT SOMETHING RESPONDS TO SOME INTERNAL ADDRESSES.
2699                                  ;*      THIS PROCESSOR STATUS WORD AND STACK LIMIT REG. (IF
2700                                  ;*      AVAILABLE) ARE TESTED IF EXECUTING ON AN 11/40, THE CPU
2701                                  ;*      ERROR REG. 2 MICROBREAK REG. ARE ALSO CHECKED IF ON AN 11/6X.
2702                                  ;*      IF A TRAP TO 'ERRVEC' (004) OCCURS IT IS ASSUMED
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                                ;*      THAT A REGISTER HAS TIMED OUT, AND AN ERROR IS REPORTED.
                                ;*
                                ;*      ERRORS THAT OCCUR IN THIS TEST ARE REPORTED FROM AN AREA
                                ;*      AT THE END OF THIS TEST, STARTING AT "50$".
                                ;*
                                ;;*****************************************************************
021010                          TST1:
021010  012737  021040  001110          MOV     #20$,$LPERR     ;SET LOOP ON ERROR POINTER TO 20$
021016  012737  000001  001102          MOV     #1,$TSTNM       ;LOAD TEST NUMBER INTO MEMORY
021024  013777  001102  160110          MOV     $TSTNM,@DISPLAY ;DISPLAY TEST NUMBER FOR THIS TEST
021032  012737  021142  001444          MOV     #TST2,NXTTST    ;SAVE STARTING ADDRESS OF NEXT TEST
                                                                ;FOR ESCAPE ON PARITY ERRORS
021040  012737  021136  000004  20$:     MOV     #50$,ERRVEC     ;SET TIME OUT VECTOR TO SPECIAL ROUTINE
021046  012706  001100                  MOV     #1100,KSP       ;SET KERNEL STACK POINTER TO 1100
021052  012700  177776          1$:     MOV     #PSW,R0         ;SAVE ADDRESS IN CASE OF TIMEOUT
021056  005737  177776                  TST     @#PSW           ;TRY TO READ PROCESSOR STATUS WORD
021062  012700  177774                  MOV     #STKLMT,R0      ;SAVE ADDRESS IN CASE OF TIMEOUT
021066  005737  177774                  TST     @#STKLMT        ;TRY TO READ STACK LIMIT REG.

021072  105737  001446                  TSTB    FORTY           ;EXECUTING ON AN 11/40?
021076  001010                          BNE     2$              ;BRANCH IF YES
021100  012700  177766                  MOV     #CPUERR,R0      ;SAVE ADDRESS IN CASE OF TIMEOUT
021104  005737  177766                  TST     @#CPUERR                ;TRY TO READ CPU ERROR REG.
021110  012700  177770                  MOV     #177770,R0      ;SAVE ADDRESS IN CASE OF TIMEOUT
021114  005737  177770                  TST     @#177770        ;TRY TO READ MICROBREAK REG.

021120                          2$:
021120  012737  021040  001110          MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
021126  012737  015160  000004          MOV     #CPUER,ERRVEC   ;SET UP C.P.U. ERROR VECTOR
021134  000402                          BR      TST2            ;;TEST OVER BRANCH TO NEXT TEST

021136  104020                  50$:     ERROR   20              ;CPU REGISTER TIMED OUT
021140  000006                          RTT                     ;GO BACK AND FINISH TEST


                                ;;*****************************************************************
                                ;*TEST 2        STACK LIMIT REGISTER
                                ;*
                                ;*      THE STACK LIMIT REGISTER IS A HIGH(ODD) BYTE ONLY REGISTER, SO THIS
                                ;*      TEST TRIES TO LOAD BOTH BYTES OF ADDRESS 177774 AND CHECKS
                                ;*      THAT ONLY THE HIGH(ODD) BYTE IS LOADED.  THE LOW(EVEN) BYTE WILL ALWAYS
                                ;*      BE READ AS ZERO.
                                ;*      THIS TEST WILL ALSO BYTE ADDRESS THE STACK LIMIT
                                ;*      REGISTER USING ADDR. 177775 AND WRITE/CLEAR
                                ;*      EACH BIT OF THE HIGH(ODD) BYTE.
                                ;*      A RESET IS ALSO EXECUTED TO SEE THAT IT WILL
                                ;*      CLEAR THE STACK LIMIT REGISTER(DUE TO MICROCODE
                                ;*      FOR RESET)
                                ;*
                                ;*      THIS TEST IS SKIPPED IF EXECUTING ON AN 11/40 THAT DOES
                                ;*      NOT HAVE A STACK LIMIT REG.
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2759                                    ;*
2760                                    ;;*****************************************************************
2761  021142                            TST2:
2762  021142  000004                           SCOPE
2763  021144  012737  021352  001444           MOV     #TST3,NXTTST    ;SAVE STARTING ADDRESS OF NEXT
2764                                                                    ;TEST FOR ESCAPE ON PARITY ERRORS
2765  021152  104410                           TBITO                   ;MAKE SURE T-BIT IS OFF FOR THIS TEST
2766  021154  012737  021166  001110  20$:     MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
2767  021162  012700  177774                   MOV     #177774,R0      ;LOAD ADDRESS OF STACK LIMIT REGISTER
2768  021166  012710  000777           1$:     MOV     #777,(R0)       ;ONLY HIGH(ODD) BYTE SHOULD BE LOADED
2769  021172  011001                           MOV     (R0),R1         ;READ STACK LIMIT REGISTER
2770  021174  005010                           CLR     (R0)            ;LEAVE STACK LIMIT REGISTER CLEAR
2771  021176  012702  000400                   MOV     #400,R2         ;LOAD EXPECTED DATA INTO R2
2772  021202  020102                           CMP     R1,R2           ;DID YOU REFERENCE THE STACK LIMIT REG
2773  021204  001401                           BEQ     2$              ;BRANCH IF IT WAS STACK LIMIT
2774  021206  104026                           ERROR   26              ;NOT STACK LIMIT REGISTER
2775  021210  005200                    2$:    INC     R0              ;CHANGE ADDRESS TO REFERENCE HIGH(ODD) BYTE
2776  021212  012737  021220  001110           MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
2777  021220  112710  000001           3$:     MOVB    #1,(R0)         ;SHOULD ONLY LOAD HIGH(ODD) BYTE
2778  021224  005300                           DEC     R0              ;CHANGE ADDRESS TO REFERENCE WORD
2779  021226  011001                           MOV     (R0),R1         ;READ STACK LIMIT REGISTER
2780  021230  005010                           CLR     (R0)            ;LEAVE STACK LIMIT REGISTER CLEAR
2781  021232  012702  000400                   MOV     #400,R2         ;LOAD EXPECTED DATA INTO R2
2782  021236  020102                           CMP     R1,R2           ;DID YOU REFERENCE HIGH(ODD) BYTE
2783  021240  001403                           BEQ     4$              ;BRANCH IF DATA MATCHES
2784  021242  005200                           INC     R0              ;CHANGE ADDRESS TO ODD BYTE FOR ERROR
2785  021244  104025                           ERROR   25              ;WRONG DATA BACK FROM STACK LIMIT REG
2786  021246  005300                           DEC     R0              ;CHANGE ADDRESS BACK TO WORD ADDRESS
2787  021250  012737  021262  001110  4$:     MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
2788  021256  012702  000400                   MOV     #400,R2         ;LOAD TEST PATTERN INTO R2
2789  021262  010210                    5$:    MOV     R2,(R0)         ;LOAD TEST PATTERN INTO STACK LIMIT REG.
2790  021264  011001                           MOV     (R0),R1         ;READ STACK LIMIT REGISTER
2791  021266  020201                           CMP     R2,R1           ;WAS CORRECT DATA READ
2792  021270  001402                           BEQ     6$              ;BRANCH IF DATA MATCHES
2793  021272  005010                           CLR     (R0)            ;CLEAR STK. LMT. REG. FOR ERROR CALL
2794  021274  104025                           ERROR   25              ;WRONG DATA BACK FROM STACK LIMIT REG.
2795  021276  012737  021276  001110  6$:     MOV     #6$,$LPERR      ;SET LOOP ON ERROR POINTER TO 6$
2796  021304  005010                           CLR     (R0)            ;TRY TO CLEAR THE STACK LIMIT REG
2797  021306  011001                           MOV     (R0),R1         ;READ THE STACK LIMIT REGISTER
2798  021310  001401                           BEQ     7$              ;BRANCH IF STACK LIMIT REG WAS CLEARED
2799  021312  104021                           ERROR   21              ;STACK LIMIT REG WOULD NOT CLEAR
2800  021314  006302                    7$:    ASL     R2              ;CHANGE TEST DATA TO TEST NEXT BIT
2801  021316  012737  021262  001110           MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
2802  021324  103356                           BCC     5$              ;BRANCH UNTIL BITS ARE ALL TESTED
2803  021326  012710  177400                   MOV     #177400,(R0)    ;LOAD STACK LIMIT REG. WITH ALL 1'S
2804  021332  000005                           RESET                   ;TRY TO CLEAR WITH A RESET INST.
2805  021334  011001                           MOV     (R0),R1         ;READ THE STACK LIMIT REG.
2806  021336  001402                           BEQ     8$              ;BRANCH IF WAS CLEARED
2807  021340  005010                           CLR     (R0)            ;CLEAR STK. LMT. REG. FOR ERROR CALL
2808  021342  104021                           ERROR   21              ;STACK LIMIT REG. WOULD NOT CLEAR
2809  021344  012737  021154  001110  8$:     MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
2810
2811
2812
2813                                    ;;*****************************************************************
2814                                    ;*TEST 3         PROCESSOR STATUS WORD
```

```
2815                                    ;*
2816                                    ;*      THIS TEST SETS THE PRIORITY LEVEL TO 7 AND CLEARS THE
2817                                    ;*      CONDITION CODES AND CHECKS TO SEE THAT ADDRESS 177776
2818                                    ;*      HAS 340 IN ITS LOW BYTE.
2819                                    ;*
2820                                    ;**********************************************************************
2821  021352                            TST3:
2822  021352  000004                           SCOPE
2823  021354  012737  021442  001444           MOV     #TST4,NXTTST    ;SAVE STARTING ADDRESS OF NEXT
2824                                                                    ;TEST FOR ESCAPE ON PARITY ERRORS
2825  021362  104411                           TBITR                   ;RESTORE THE T-BIT IF IT WAS ON
2826                                                                    ;BEFORE THE LAST TEST
2827  021364  012737  021372  001106           MOV     #20$,$LPADR     ;SET LOOP ADDRESS POINTER TO 20$
2828                                                                    ;FOR ITERATION PASS
2829  021372  012737  021410  001110  20$:     MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
2830  021400  012700  177776                   MOV     #177776,R0      ;LOAD ADDRESS OF P.S.W. INTO R0
2831  021404  012702  000340                   MOV     #340,R2         ;LOAD EXPECTED DATA INTO R2
2832  021410  005010                    1$:    CLR     (R0)            ;CLEAR THE PSW
2833  021412  052710  000340                   BIS     #340,(R0)       ;SET PRIORITY TO LEVEL SEVEN
2834  021416  000257                           CCC                     ;CLEAR ALL CONDITION CODES
2835  021420  111001                           MOVB    (R0),R1         ;LOAD LOWER BYTE OF P.S.W. INTO R1
2836  021422  042701  177420                   BIC     #177420,R1      ;CLEAR "REG. SIGN EXTEND" AND T-BIT
2837  021426  020201                           CMP     R2,R1           ;LOWER BYTE OF PSW SHOULD BE 340
2838  021430  001401                           BEQ     2$              ;BRANCH IF PSW IS CORRECT
2839  021432  104023                           ERROR   23              ;MUST HAVE READ SOME OTHER REGISTER
2840  021434  012737  021372  001110  2$:     MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
2841
2842
2843                                    ;**********************************************************************
2844                                    ;*TEST 4        SET UP THE STACK POINTERS FOR REST OF TESTS
2845                                    ;*
2846                                    ;*      THIS TEST IS USED TO SET THE KERNEL STACK POINTER AT
2847                                    ;*      1100 AND THE USER STACK POINTER AT 700.  IT THEN RETURNS
2848                                    ;*      TO KERNEL MODE AND VERIFIES THAT THE KERNEL STACK
2849                                    ;*      POINTER IS STILL AT 1100.
2850                                    ;*
2851                                    ;**********************************************************************
2852  021442                            TST4:
2853  021442  000004                           SCOPE
2854  021444  012737  021512  001444           MOV     #TST5,NXTTST    ;SAVE STARTING ADDRESS OF NEXT
2855                                                                    ;TEST FOR ESCAPE ON PARITY ERRORS
2856  021452  005037  177776                   CLR     PSW             ;GET TO KERNEL MODE, PRIORITY 0
2857  021456  012706  001100                   MOV     #KERSTK,KSP     ;SETUP KERNEL STACK POINTER
2858  021462  012737  140000  177776           MOV     #140000,PSW     ;GET INTO USER MODE
2859  021470  012706  000700                   MOV     #USESTK,USP     ;SET UP USER STACK POINTER
2860  021474  005037  177776                   CLR     PSW             ;GET BACK INTO KERNEL MODE
2861  021500  010600                           MOV     KSP,R0          ;READ KSRNEL STACK POINTER
2862  021502  022700  001100                   CMP     #KERSTK,R0      ;SEE IF KERNEL STACK IS STILL 1100
2863  021506  001401                           BEQ     TST5            ;;BRANCH IF KERNEL STACK IS OKAY
2864  021510  104027                           ERROR   27              ;KERNEL STACK POINTER IS NOT RIGHT
2865
2866
2867                                    .SBTTL  ************ ENTRY POINT 2 --- STARTING ADDRESS 204 ************
2868                                    .SBTTL  ** TEST READ/WRITE BITS IN MEMORY MANAGEMENT STATUS REGISTERS **
2869                                    ;*
2870                                    ;*      THIS GROUP OF TESTS EXERCISES ALL OF THE READ-WRITE BITS
```

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                                ;*      IN MMR0, AND TRIES A FEW VIRTUAL ADDRESSES IN MMR2.
                                ;*      THESE TESTS SHOW THAT ONCE THE MMR LOCK UP SIGNAL GOES LOW
                                ;*      MMR2 STOPS TRACKING THE C.P.U. OPERATIONS.
                                ;*
                                ;
                                ;;*****************************************************************
                                ;*TEST 5        BIT TEST OF MEMORY MANAGEMENT REGISTER 0
                                ;*
                                ;*      THIS TEST TRIES TO SET AND CLEAR BITS <15:13> OF
                                ;*      MMR0.  'INIT' IS ISSUED TO SEE THAT IT WILL CLEAR THESE BITS.
                                ;*      THE OTHER BITS OF MMR0 ARE CLOCKED ONLY ON MEMORY
                                ;*      MANAGEMENT ERROR CONDITIONS IF RELOCATION IS ENABLED.
                                ;*      BIT <00> ENABLES FULL RELOCATION AND BIT <08> ENABLES
                                ;*      RELOCATION ON THE DESTINATION CYCLE ONLY.  THESE BITS WILL
                                ;*      BE TESTED IN A LATER TEST.
                                ;*
                                ;;*****************************************************************
021512                          TST5:
                                        SCOPE
021512  000004
021514  012737  021700  001444        MOV     #TST6,NXTTST    ;SAVE STARTING ADDRESS OF NEXT
                                                                ;TEST FOR ESCAPE ON PARITY ERRORS
021522                          ENTPT2:
021522  012737  021544  001110        MOV     #20$,$LPERR     ;SET LOOP ON ERROR POINTER TO 20$
021530  012737  000005  001102        MOV     #5,$TSTNM       ;LOAD TEST NUMBER INTO MEMORY
021536  013777  001102  157376        MOV     $TSTNM,@DISPLAY ;DISPLAY TEST NUMBER FOR THIS TEST
021544  012700  177572        20$:    MOV     #MMR0,R0        ;PUT ADDRESS OF MMR0 IN R0
021550  012710  160000                MOV     #160000,(R0)    ;LOAD WRITABLE BITS IN MMR0
021554  000005                        RESET                   ;'INIT'  SHOULD CLEAR ALL BITS OF MMR0
021556  011001                        MOV     (R0),R1         ;READ MMR0
021560  001401                        BEQ     1$              ;BRANCH IF MMR0 IS CLEAR
021562  104007                        ERROR   7               ;MMR0 WON'T CLEAR
021564  012737  021572  001110  1$:   MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
021572  012710  160000        11$:    MOV     #160000,(R0)    ;SET BITS <15:13> OF MMR0
021576  011001                        MOV     (R0),R1         ;READ MMR0
021600  022701  160000                CMP     #160000,R1      ;SEE IF BITS <15:13> ARE SET
021604  001401                        BEQ     2$              ;BRANCH IF CORRECT BITS ARE SET
021606  104010                        ERROR   10              ;CAN'T SET 160000 IN MMR0
021610  012737  021616  001110  2$:   MOV     #12$,$LPERR     ;SET LOOP ON ERROR POINTER TO 12$
021616  005010        12$:            CLR     (R0)            ;CLEAR UPPER 3 BITS OF MMR0
021620  011001                        MOV     (R0),R1         ;READ MMR0
021622  001401                        BEQ     3$              ;BRANCH IF MMR0 IS CLEAR
021624  104007                        ERROR   7               ;MMR0 WON'T CLEAR
021626  012737  021644  001110  3$:   MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
021634  012702  100000                MOV     #BIT15,R2       ;SET BIT IN R2 TO FLOAT THRU MMR0
021640  012703  000003                MOV     #3,R3           ;PUT LOOP COUNT IN R3
021644  010210        5$:             MOV     R2,(R0)         ;LOAD R2 INTO MMR0
021646  011001                        MOV     (R0),R1         ;READ MMR0 IN R1
021650  005010                        CLR     (R0)            ;CLEAR MMR0
021652  010204                        MOV     R2,R4           ;PUT PATTERN IN R4
021654  042704  017777                BIC     #017777,R4      ;MASK OFF BITS <12:00>
021660  020401                        CMP     R4,R1           ;COMPARE PATTERN WITH MMR0
021662  001401                        BEQ     4$              ;BRANCH IF DATA MATCHES
021664  104011                        ERROR   11              ;GOT WRONG DATA FROM MMR0
021666  006002        4$:             ROR     R2              ;SHIFT BIT TO RIGHT
021670  077313                        SOB     R3,5$           ;LOOP BACK TWICE
```

```
                                        MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST


                                ;;*****************************************************************
                                ;*TEST 6         SEE THAT MEMORY MANAGEMENT REGISTER 1 READS 0'S
                                ;*
                                ;*      THIS TEST WILL ENSURE THAT ALTHOUGH MEMORY MANAGEMENT
                                ;*      REGISTER #1 (777574) IS NON-EXSISTENT, THAT ADDRESS
                                ;*      WILL RESPOND AND READ AS THOUGH THERE WAS A REGISTER
                                ;*      THERE AND THAT IT READS AS ALL ZEROES.
                                ;*
                                ;;*****************************************************************
021700                          TST6:
                                        SCOPE
021700  000004
021702  012737  021730  001444        MOV     #TST7,NXTTST    ;SAVE STARTING ADDRESS OF NEXT
                                                                ;TEST FOR ESCAPE ON PARITY ERRORS

021710  012700  177574          20$:    MOV     #MMR1,R0        ;PUT ADDRESS OF MMR1 IN R0
021714  012701  177777                  MOV     #-1,R1          ;LOAD R1 WITH ALL ONES
021720  011001                          MOV     (R0),R1         ;READ MMR1 INTO R1
021722  005701                          TST     R1              ;DID MMR1 READ AS ALL ZEROES?
021724  001401                          BEQ     1$              ;BRANCH IF YES
021726  104024                          ERROR   24              ;MMR1 DID NOT READ ALL ZEROES
021730                          1$:


                                ;;*****************************************************************
                                ;*TEST 7         BIT TEST OF MEMORY MANAGEMENT REGISTER 2
                                ;*
                                ;*      HERE MMR2 WILL BE READ SEVERAL DIFFERENT TIMES TO
                                ;*      SEE THAT IT IS TRACKING PROPERLY.  THEN IT WILL BE
                                ;*      LOCKED UP AND READ IT TO SEE THAT IT DOES NOT CHANGE AFTER
                                ;*      IT IS ONCE LOCKED UP.  NOT ALL BITS WILL BE TESTED IN THIS
                                ;*      TEST BUT A LATER TEST RUNS A COUNT PATTERN THROUGH MMR2.  THIS
                                ;*      CANNOT BE DONE HERE SINCE IT REQUIRES THAT THE ABORT LOGIC IS
                                ;*      FUNCTIONING PROPERLY.
                                ;*
                                ;;*****************************************************************
021730                          TST7:
                                        SCOPE
021730  000004
021732  012737  022074  001444        MOV     #TST10,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
                                                                ;TEST FOR ESCAPE ON PARITY ERRORS
021740  012700  177572          20$:    MOV     #MMR0,R0        ;PUT ADDRESS OF MMR0 IN R0
021744  012701  177576                  MOV     #MMR2,R1        ;PUT ADDRESS OF MMR2 IN R1
021750  012737  021762  001110        MOV     #21$,$LPERR     ;SET LOOP ON ERROR POINTER TO 21$
021756  005037  177572                  CLR     @#MMR0          ;MAKE SURE THAT MMR0 IS CLEAR
021762  011102                  21$:    MOV     (R1),R2         ;READ MMR2 TO R2
021764  012703  021762                  MOV     #21$,R3         ;PUT ADDRESS OF LAST INST IN R3
021770  020203                          CMP     R2,R3           ;SEE IF MMR2 HELD CORRECT ADDRESS
021772  001401                          BEQ     1$              ;BRANCH IF DATA MATCHES
021774  104012                          ERROR   12              ;MMR2 DID NOT TRACK PROPERLY
021776  012737  022004  001110  1$:     MOV     #22$,$LPERR     ;SET LOOP ON ERROR POINTER TO 22$
022004  013702  177576          22$:    MOV     @#MMR2,R2       ;READ MMR2 TO R2
022010  012703  022004                  MOV     #22$,R3         ;PUT ADDRESS OF LAST INST IN R3
```

```
2983   022014  020203                          CMP     R2,R3           ;SEE IF MMR2 HELD CORRECT ADDRESS
2984   022016  001401                          BEQ     2$              ;BRANCH IF DATA MATCHES
2985   022020  104012                          ERROR   12              ;MMR2 DID NOT TRACK PROPERL
2986   022022  012737  022030  001110  2$:     MOV     #23$,$LPERR     ;SET LOOP ON ERROR POINTER TO 23$
2987   022030  012710  040000          23$:    MOV     #40000,(R0)     ;LOCK UP MMR2
2988   022034  011102                          MOV     (P1),R2         ;READ MMR2 INTO R2
2989   022036  012703  022030                  MOV     #23$,R3         ;PUT LOCKING INST'S ADDRESS IN R3
2990   022042  020203                          CMP     R2,R3           ;SEE IF MMR2 HOLDS RIGHT ADDRESS
2991   022044  001401                          BEQ     3$              ;BRANCH IF DATA MATCHES
2992   022046  104012                          ERROR   12              ;MMR2 DID NOT TRACK PROPERLY
2993   022050  012737  022056  001110  3$:     MOV     #14$,$LPERR     ;SET LOOP ON ERROR POINTER TO 14$
2994   022056  000005          14$:    RESET                           ;ISSUE INIT TO CLEAR MMR2
2995   022060  011102          25$:    MOV     (R1),R2         ;READ MMR2 INTO R2
2996   022062  012703  022060                  MOV     #25$,R3         ;PUT ADDRESS OF LAST INST IN R3
2997   022066  020203                          CMP     R2,R3           ;SEE IF MMR2 IS STILL TRACKING
2998   022070  001401                          BEQ     TST10           ;GO TO NEXT TEST IF IT IS
2999   022072  104012                          ERROR   12              ;MMR2 DID NOT TRACK PROPERLY
3000
3001
3002
3003                                   .SBTTL  ********** ENTRY POINT 3 --- STARTING ADDRESS 210 **********
3004                                   .SBTTL  ********** PAGE ADDRESS AND DESCRIPTOR REGISTER TESTS **********
3005                                   ;*
3006                                   ;*      THIS GROUP OF TESTS IS USED TO CHECK ALL THE PAR'S AND
3007                                   ;*      PDR'S; THEIR ADDRESS DECODING ON DIRECT REFERENCES, THEIR
3008                                   ;*      READ/WRITE BITS, AND DUAL ADDRESSING WITHIN A GROUP OR BETWEEN
3009                                   ;*      TWO GROUPS.
3010                                   ;*
3011
3012
3013                                   .SBTTL          TEST THAT ALL P.A.R.'S & P.D.R.'S RESPOND
3014                                   ;*      THESE NEXT FOUR (4) TESTS VERIFY THAT THERE ARE 4 GROUPS OF
3015                                   ;*      8 CONTIGUOUS ADDRESSES IN THE I/O PAGE THAT WILL RESPOND
3016                                   ;*      WITHOUT TIMING OUT.  AT THIS POINT THE TEST IS NOT CONCERNED
3017                                   ;*      WITH EXACTLY WHAT IS RESPONDING, JUST THAT SOMETHING RESPONDS.
3018                                   ;*
3019                                   ;**************************************************************
3020                                   ;*TEST 10       READ ALL KERNEL PAGE ADDRESS REGISTERS, CHECK FOR TIMEOUT
3021                                   ;*
3022                                   ;*      THIS TEST DOES A READ FROM ALL THE KERNEL PAGE ADDRESS REGISTERS
3023                                   ;*      'ERRVEC' IS SET TO 'TIMEOUT' AT THE BEGINNING OF THE TEST AND
3024                                   ;*      IF ANY OF THE 8 KERNEL ADDRESS REGISTERS TIME OUT THEIR I/O
3025                                   ;*      PAGE ADDRESS IS REPORTED AND LOGGED.  AT THE END OF THE TEST A
3026                                   ;*      SUMMARY OF THE ERRORS IS GIVEN AND 'ERRVEC' IS RE-SET TO 'CPUER'.
3027                                   ;*
3028                                   ;*      ALL ERRORS IN THIS TEST ARE REPORTED BY SUBROUTINE "TIMEOUT"
3029                                   ;*
3030                                   ;**************************************************************
3031   022074                          TST10:
3032   022074  000004                          SCOPE
3033   022076  012737  022220  001444          MOV     #TST11,NXTST    ;SAVE STARTING ADDRESS OF NEXT
3034                                                                   ;TEST FOR ESCAPE ON PARITY ERRORS
3035   022104                          ENTPT3:
3036   022104  012737  022126  001110          MOV     #20$,$LPERR     ;SET LOOP ON ERROR POINTER TO 20$
3037   022112  012737  000010  001102          MOV     #10,$TSTNM      ;LOAD TEST NUMBER INTO MEMORY
3038   022120  013777  001102  157014          MOV     $TSTNM,@DISPLAY ;DISPLAY TEST NUMBER FOR THIS TEST
```

```
3039  022126  004737  044254          20$:    JSR     PC,CLEANUP      ;INITIALIZE ERROR LOCATIONS
3040  022132  012737  044312  000004          MOV     #TIMEOUT,ERRVEC ;SET CPU TRAP VECTOR TO TIMEOUT ROUTINE
3041  022140  012737  022152  001110          MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
3042  022146  012700  172340                  MOV     #KIPAR0,R0      ;PUT ADDRESS OF FIRST PAR IN R0
3043  022152  011001                  1$:     MOV     (R0),R1         ;THIS WILL TIMEOUT IF REGISTER DECODING BAD
3044  022154  062700  000002                  ADD     #2,R0           ;POINT TO NEXT REGISTER
3045  022160  022700  172356                  CMP     #KIPAR7,R0      ;SEE IF KIPAR7 HAS BEEN TRIED
3046  022164  103372                          BHIS    1$              ;BRANCH IF NOT DONE
3047  022166  012737  022126  001110          MOV     #20$,$LPERR     ;PUT LOOP ON ERROR POINTER TO START OF TEST
3048  022174  012737  015160  000004          MOV     #CPUER,ERRVEC   ;RE-SET NORMAL CPU TRAP SERVICE ROUTINE
3049  022202  005737  001430                  TST     ERRCNT          ;SEE IF ANY ERRORS OCCURRED ON THIS TEST
3050  022206  001404                          BEQ     TST11           ;;BRANCH TO NEXT TEST IF NO ERRORS
3051  022210  013737  001430  001210          MOV     ERRCNT,$TMP5    ;SAVE NUMBER OF ERRORS FOR TYPEOUT
3052  022216  104013                          ERROR   13              ;SUMMARY OF PAR ERRORS
3053
3054
3055                                    ;;**************************************************************
3056                                    ;*TEST 11       READ ALL USER PAGE ADDRESS REGISTERS, CHECK FOR TIMEOUT
3057                                    ;;
3058                                    ;;      THIS TEST DOES A READ FROM ALL THE USER PAGE ADDRESS
3059                                    ;;      REGISTERS.  'ERRVEC' IS SET TO 'TIMEOUT' AT THE BEGINNING OF THE
3060                                    ;;      TEST, AND IF ANY OF THE 8 USER ADDRESS REGISTERS TIME OUT
3061                                    ;;      THEIR I/O PAGE ADDRESS IS REPORTED AND LOGGED.  AT THE END
3062                                    ;;      OF THE TEST A SUMMARY OF ERRORS IS GIVEN AND 'ERRVEC' IS SET TO
3063                                    ;;      'CPUER'.
3064                                    ;;      ALL ERRORS IN THIS TEST ARE REPORTED BY SUBROUTINE "TIMEOUT"
3065                                    ;;**************************************************************
3066
3067  022220                          TST11:
3068  022220  000004                          SCOPE
3069  022222  012737  022322  001444          MOV     #TST12,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
3070                                                                  ;TEST FOR ESCAPE ON PARITY ERRORS
3071  022230  004737  044254          20$:    JSR     PC,CLEANUP      ;INITIALIZE ERROR LOCATIONS
3072  022234  012737  044312  000004          MOV     #TIMEOUT,ERRVEC ;SET CPU TRAP VECTOR TO TIMEOUT ROUTINE
3073  022242  012737  022254  001110          MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
3074  022250  012700  177640                  MOV     #UIPAR0,R0      ;PUT ADDRESS OF FIRST PAR IN R0
3075  022254  011001                  1$:     MOV     (R0),R1         ;THIS WILL TIMEOUT IF REGISTER DECODING BAD
3076  022256  062700  000002                  ADD     #2,R0           ;POINT TO NEXT REGISTER
3077  022262  022700  177656                  CMP     #UIPAR7,R0      ;SEE IF UIPAR7 HAS BEEN TRIED
3078  022266  103372                          BHIS    1$              ;BRANCH IF NOT DONE
3079  022270  012737  022230  001110          MOV     #20$,$LPERR     ;PUT LOOP ON ERROR POINTER TO START OF TEST
3080  022276  012737  015160  000004          MOV     #CPUER,ERRVEC   ;RE-SET NORMAL CPU TRAP SERVICE ROUTINE
3081  022304  005737  001430                  TST     ERRCNT          ;SEE IF ANY ERRORS OCCURRED ON THIS TEST
3082  022310  001404                          BEQ     TST12           ;;BRANCH TO NEXT TEST IF NO ERRORS
3083  022312  013737  001430  001210          MOV     ERRCNT,$TMP5    ;SAVE NUMBER OF ERRORS FOR TYPEOUT
3084  022320  104013                          ERROR   13              ;SUMMARY OF PAR ERRORS
3085
3086                                    ;;**************************************************************
3087                                    ;*TEST 12       READ ALL KERNEL PAGE DESCRIPTOR REGISTERS, CHECK FOR TIMEOUT
3088                                    ;;
3089                                    ;;      THIS TEST DOES A READ FROM ALL THE KERNEL PAGE DESCRIPTOR
3090                                    ;;      REGISTERS.  'ERRVEC' IS SET TO 'TIMEOUT' AT THE BEGINNING OF THE
3091                                    ;;      TEST, AND IF ANY OF THE 8 KERNEL DESCRIPTOR REGISTERS TIME OUT
3092                                    ;;      THEIR I/O PAGE ADDRESS IS REPORTED AND LOGGED.  AT THE END
3093                                    ;;      OF THE TEST A SUMMARY OF ERRORS IS GIVEN AND 'ERRVEC' IS SET TO
3094                                    ;;      'CPUER'.
```

```
                                        ;;      ALL ERRORS IN THIS TEST ARE REPORTED BY SUBROUTINE "TIMEOUT"
                                        ;;
                                        ;;**************************************************************
022322                                  TST12:
022322  000004                                  SCOPE
022324  012737  022424  001444                  MOV     #TST13,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
                                                                        ;TEST FOR ESCAPE ON PARITY ERRORS
022332  004737  044254                  20$:    JSR     PC,CLEANUP      ;INITIALIZE ERROR LOCATIONS
022336  012737  044312  000004                  MOV     #TIMEOUT,ERRVEC ;SET CPU TRAP VECTOR TO TIMEOUT ROUTINE
022344  012737  022356  001110                  MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
022352  012700  172300                          MOV     #KIPDR0,R0      ;PUT ADDRESS OF FIRST PDR IN R0
022356  011001                          1$:     MOV     (R0),R1         ;THIS WILL TIMEOUT IF REGISTER DECODING BAD
022360  062700  000002                          ADD     #2,R0           ;POINT TO NEXT REGISTER
022364  022700  172316                          CMP     #KIPDR7,R0      ;SEE IF KIPDR7 HAS BEEN TRIED
022370  103372                                  BHIS    1$              ;BRANCH IF NOT DONE
022372  012737  022332  001110                  MOV     #20$,$LPERR     ;PUT LOOP ON ERROR POINTER TO START OF TEST
022400  012737  015160  000004                  MOV     #CPUER,ERRVEC   ;RE-SET NORMAL CPU TRAP SERVICE ROUTINE
022406  005737  001430                          TST     ERRCNT          ;SEE IF ANY ERRORS OCCURRED ON THIS TEST
022412  001404                                  BEQ     TST13           ;;BRANCH TO NEXT TEST IF NO ERRORS
022414  013737  001430  001210                  MOV     ERRCNT,$TMPS    ;SAVE NUMBER OF ERRORS FOR TYPEOUT
022422  104013                                  ERROR   13              ;SUMMARY OF PDR ERRORS


                                        ;;**************************************************************
                                        ;*TEST 13       READ ALL USER PAGE DESCRIPTOR REGISTERS, CHECK FOR TIMEOUT
                                        ;;
                                        ;;      THIS TEST DOES A READ FROM ALL THE USER PAGE DESCRIPTOR
                                        ;;      REGISTERS.  'ERRVEC' IS SET TO 'TIMEOUT' AT THE BEGINNING OF THE
                                        ;;      TEST, AND IF ANY OF THE 8 USER DESCRIPTOR REGISTERS TIME OUT
                                        ;;      THEIR I/O PAGE ADDRESS IS REPORTED AND LOGGED.  AT THE END
                                        ;;      OF THE TEST A SUMMARY OF ERRORS IS GIVEN AND 'ERRVEC' IS SET TO
                                        ;;      'CPUER'.
                                        ;;      ALL ERRORS IN THIS TEST ARE REPORTED BY SUBROUTINE "TIMEOUT"
                                        ;;
                                        ;;**************************************************************
022424                                  TST13:
022424  000004                                  SCOPE
022426  012737  022526  001444                  MOV     #TST14,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
                                                                        ;TEST FOR ESCAPE ON PARITY ERRORS
022434  004737  044254                  20$:    JSR     PC,CLEANUP      ;INITIALIZE ERROR LOCATIONS
022440  012737  044312  000004                  MOV     #TIMEOUT,ERRVEC ;SET CPU TRAP VECTOR TO TIMEOUT ROUTINE
022446  012737  022460  001110                  MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
022454  012700  177600                          MOV     #UIPDR0,R0      ;PUT ADDRESS OF FIRST PDR IN R0
022460  011001                          1$:     MOV     (R0),R1         ;THIS WILL TIMEOUT IF REGISTER DECODING BAD
022462  062700  000002                          ADD     #2,R0           ;POINT TO NEXT REGISTER
022466  022700  177616                          CMP     #UIPDR7,R0      ;SEE IF UIPDR7 HAS BEEN TRIED
022472  103372                                  BHIS    1$              ;BRANCH IF NOT DONE
022474  012737  022434  001110                  MOV     #20$,$LPERR     ;PUT LOOP ON ERROR POINTER TO START OF TEST
022502  012737  015160  000004                  MOV     #CPUER,ERRVEC   ;RE-SET NORMAL CPU TRAP SERVICE ROUTINE
022510  005737  001430                          TST     ERRCNT          ;SEE IF ANY ERRORS OCCURRED ON THIS TEST
022514  001404                                  BEQ     TST14           ;;BRANCH TO NEXT TEST IF NO ERRORS
022516  013737  001430  001210                  MOV     ERRCNT,$TMPS    ;SAVE NUMBER OF ERRORS FOR TYPEOUT
022524  104013                                  ERROR   13              ;SUMMARY OF PDR ERRORS

                                        .SBTTL          TEST FOR DUAL ADDRESSING ON LOAD WITHIN GROUPS
                                        ;*      THESE NEXT FOUR (4) TESTS WILL CHECK FOR DUAL ADDRESSING WITHIN A
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3151                    ;*      GROUP OF PAR'S OR PDR'S.  FIRST ALL OF THE REGISTERS IN A GROUP
3152                    ;*      ARE CLEARED AND READ TO SEE THAT THEY CAN EACH HOLD ZEROES. AND
```

```
                                ;*      THAT THE DATA PATH DOES NOT HAVE A BIT STUCK AT ONE.
                                ;*      THEN ONE REGISTER AT A TIME, WITHIN THAT GROUP, IS LOADED
                                ;*      WITH A NEGATIVE ONE WHILE ALL REGISTERS ARE READ TO SEE
                                ;*      THAT ONLY THE REGISTER UNDER TEST WAS NOT ZERO.
                                ;*
                                ;;**************************************************************
                                ;*TEST 14       DUAL ADDRESS KERNEL PAGE ADDRESS REGISTERS, ON LOADING
                                ;*
                                ;*      THIS TEST FIRST CLEARS ALL THE KERNEL PAGE ADDRESS REGISTERS,
                                ;*      AND CHECKS TO SEE THAT THEY EACH HOLD ZERO.  THEN, STARTING
                                ;*      WITH ADDRESS REGISTER ZERO, ONE REGISTER AT A TIME
                                ;*      IS LOADED WITH A NEGATIVE ONE.  ALL KERNEL ADDRESS REGISTERS
                                ;*      ARE NOW READ TO SEE THAT ONLY THE REGISTER UNDER TEST IS NON-
                                ;*      ZERO.  INDIVIDUAL ERRORS ARE REPORTED AND A SUMMARY OF THEM
                                ;*      IS GIVEN AT THE END OF THIS TEST.
                                ;*
                                ;*      ALL ERRORS IN THIS TEST ARE REPORTED AND ANALYZED BY SUBROUTINE
                                ;*      "DUALADR".
                                ;;**************************************************************
022526                          TST14:
022526  000004                          SCOPE
022530  012737  022732  001444          MOV     #TST15,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
                                                                ;TEST FOR ESCAPE ON PARITY ERRORS
022536  004737  044254          20$:    JSR     PC,CLEANUP      ;INITIALIZE ERROR LOCATIONS
022542  012737  022570  001110          MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
022550  012705  172340                  MOV     #KIPAR0,R5      ;PUT ADDRESS OF FIRST PAR IN R5
022554  004737  044236                  JSR     PC,CLRREG       ;CLEAR 8 REGISTERS POINTED TO BY R5
022560  012700  172340                  MOV     #KIPAR0,R0      ;PUT ADDRESS OF FIRST PAR IN R0
022564  012701  000010                  MOV     #10,R1          ;BRANCH COUNT IS 8 DECIMAL
022570  011002                  1$:     MOV     (R0),R2         ;READ PAR TO R2
022572  001401                          BEQ     2$              ;BRANCH IF PAR IS 0
022574  104014                          ERROR   14              ;PAR NOT ZERO
022576  062700  000002          2$:     ADD     #2,R0           ;POINT TO NEXT REGISTER
022602  077106                          SOB     R1,1$           ;BRANCH BACK TO 1$ 7 TIMES
                                ;;
                                ;;  NOW START DUAL ADDRESSING TEST BY LOADING -1 INTO ONE
                                ;;  REGISTER AND READING THE REST TO SEE ONLY THAT REGISTER
                                ;;  IS NON-ZERO. (DROPPED BITS  WILL BE FOUND IN NEXT TEST.)
                                ;;
022604  012737  022616  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
022612  012700  172340                  MOV     #KIPAR0,R0      ;PUT ADDRESS OF FIRST PAR IS R0
022616  012705  172340          3$:     MOV     #KIPAR0,R5      ;LOAD STARTING ADDRESS INTO R5
022622  004737  044236                  JSR     PC,CLRREG       ;CLEAR 8 REGISTERS POINTED TO BY R5
022626  012701  172356                  MOV     #KIPAR7,R1      ;PUT KIPAR7 ADDRESS IN R1
022632  012710  177777                  MOV     #-1,(R0)        ;LOAD REGISTER UNDER TEST
022636  005037  001176          4$:     CLR     $TMP0           ;FLAG TO INDICATE THERE WAS A MATCH
022642  011102                          MOV     (R1),R2         ;READ ALL REGISTERS
022644  001406                          BEQ     6$              ;BRANCH IF REGISTER IS 0
022646  020001                          CMP     R0,R1           ;IS ADDRESS OF NON-ZERO REGISTER SAME
                                                                ;AS THAT OF REGISTER UNDER TEST
022650  001402                          BEQ     5$              ;BRANCH IF ADDRESSES MATCH
022652  004737  044406                  JSR     PC,DUALADR      ;LOG AND REPORT ERRORS
022656  005237  001176          5$:     INC     $TMP0           ;SET FLAG WHEN ADDRESSES MATCH
022662  162701  000002          6$:     SUB     #2,R1           ;POINT TO NEXT REGISTER
022666  022701  172340                  CMP     #KIPAR0,R1      ;SEE IF ALL REGISTERS HAVE BEEN READ
022672  101761                          BLOS    4$              ;BRANCH IF MORE TO READ
```

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                                ADD     #2,R0           ;NOW LOAD NEXT REGISTER
                                CMP     #KIPAR7,R0      ;SEE IF THERE ARE MORE REGISTERS TO TEST
                                BHIS    3$              ;BRANCH IF MORE REGISTERS TO TEST
                                MOV     #20$,$LPERR     ;SET LOOP ON ERROR POINTER TO START OF TEST
                                TST     ERRCNT          ;SEE IF THERE WERE ANY ERRORS
                                BEQ     TST15           ;BRANCH TO NEXT TEST IF NO ERRORS
                                MOV     ERRCNT,$TMP5    ;SAVE NUMBER OF ERRORS FOR PAR OUT
                                ERROR   15              ;SUMMARY OF DUAL ADDRESSING ERRORS

;;*****************************************************************
;*TEST 15        DUAL ADDRESS USER PAGE ADDRESS REGISTERS, ON LOADING
;;
;;      THIS TEST FIRST CLEARS ALL THE USER PAGE ADDRESS REGISTERS
;;      AND CHECKS TO SEE THAT THEY EACH HOLD ZERO.  THEN, STARTING WITH
;;      ADDRESS REGISTER ZERO, ONE REGISTER AT A TIME IS
;;      LOADED WITH A NEGATIVE ONE.  ALL USER ADDRESS REGISTERS
;;      ARE NOW READ TO SEE THAT ONLY THE ONE UNDER TEST IS NON-ZERO.
;;      INDIVIDUAL ERRORS ARE REPORTED AND A SUMMARY OF THEM IS GIVEN AT
;;      THE END OF THIS TEST.
;;
;;      ALL ERRORS IN THIS TEST ARE REPORTED AND ANALYZED BY SUBROUTINE
;;      "DUALADR".
;;*****************************************************************
TST15:
                                SCOPE
                                MOV     #TST16,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
                                                        ;TEST FOR ESCAPE ON PARITY ERRORS
20$:                            JSR     PC,CLEANUP      ;INITIALIZE ERROR LOCATIONS
                                MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
                                MOV     #UIPAR0,R5      ;PUT ADDRESS OF FIRST PAR IN R5
                                JSR     PC,CLRREG       ;CLEAR 8 REGISTERS POINTED TO BY R5
                                MOV     #UIPAR0,R0      ;PUT ADDRESS OF FIRST PAR IN R0
                                MOV     #10,R1          ;BRANCH COUNT IS 8 DECIMAL
1$:                             MOV     (R0),R2         ;READ PAR TO R2
                                BEQ     2$              ;BRANCH IF PAR IS 0
                                ERROR   14              ;PAR NOT ZERO
2$:                             ADD     #2,R0           ;POINT TO NEXT REGISTER
                                SOB     R1,1$           ;BRANCH BACK TO 1$ 7 TIMES
;;
;;  NOW START DUAL ADDRESSING TEST BY LOADING -1 INTO ONE
;;  REGISTER AND READING THE REST TO SEE ONLY THAT REGISTER
;;  IS NON-ZERO. (DROPPED BITS  WILL BE FOUND IN NEXT TEST.)
;;
                                MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
                                MOV     #UIPAR0,R0      ;PUT ADDRESS OF FIRST PAR IS R0
3$:                             MOV     #UIPAR0,R5      ;LOAD STARTING ADDRESS INTO R5
                                JSR     PC,CLRREG       ;CLEAR 8 REGISTERS POINTED TO BY R5
                                MOV     #UIPAR7,R1      ;PUT UIPAR7 ADDRESS IN R1
                                MOV     #-1,(R0)        ;LOAD REGISTER UNDER TEST
4$:                             CLR     $TMP0           ;FLAG TO INDICATE THERE WAS A MATCH
                                MOV     (R1),R2         ;READ ALL REGISTERS
                                BEQ     6$              ;BRANCH IF REGISTER IS 0
                                CMP     R0,R1           ;IS ADDRESS OF NON-ZERO REGISTER SAME
                                                        ;AS THAT OF REGISTER UNDER TEST
                                BEQ     5$              ;BRANCH IF ADDRESSES MATCH
```

```
3265  023056  004737  044406            JSR     PC,DUALADR      ;LOG AND REPORT ERRORS
3266  023062  005237  001176      5$:   INC     $TMP0           ;SET FLAG WHEN ADDRESSES MATCH
3267  023066  162701  000002      6$:   SUB     #2,R1           ;POINT TO NEXT REGISTER
3268  023072  022701  177640            CMP     #UIPAR0,R1      ;SEE IF ALL REGISTERS HAVE BEEN READ
3269  023076  101761                    BLOS    4$              ;BRANCH IF MORE TO READ
3270  023100  062700  000002            ADD     #2,R0           ;NOW LOAD NEXT REGISTER
3271  023104  022700  177656            CMP     #UIPAR7,R0      ;SEE IF THERE ARE MORE REGISTERS TO TEST
3272  023110  103344                    BHIS    3$              ;BRANCH IF MORE REGISTERS TO TEST
3273  023112  012737  022742  001110    MOV     #20$,$LPERR     ;SET LOOP ON ERROR POINTER TO START OF TEST
3274  023120  005737  001430            TST     ERRCNT          ;SEE IF THERE WERE ANY ERRORS
3275  023124  001404                    BEQ     TST16           ;;BRANCH TO NEXT TEST IF NO ERRORS
3276  023126  013737  001430  001210    MOV     ERRCNT,$TMP5    ;SAVE NUMBER OF ERRORS FOR PAR OUT
3277  023134  104015                    ERROR   15              ;SUMMARY OF DUAL ADDRESSING ERRORS
3278
3279                                    ;;**************************************************************
3280                                    ;*TEST 16       DUAL ADDRESS KERNEL PAGE DESCRIPTOR REGISTERS, ON LOADING
3281                                    ;;
3282                                    ;;      THIS TEST FIRST CLEARS ALL THE KERNEL PAGE DESCRIPTOR REGISTERS
3283                                    ;;      AND CHECKS TO SEE THAT THEY EACH HOLD ZERO.  THEN, STARTING WITH
3284                                    ;;      DESCRIPTOR REGISTER ZERO, ONE REGISTER AT A TIME IS
3285                                    ;;      LOADED WITH A NEGATIVE ONE.  ALL KERNEL DESCRIPTOR REGISTERS
3286                                    ;;      ARE NOW READ TO SEE THAT ONLY THE ONE UNDER TEST IS NON-ZERO.
3287                                    ;;      INDIVIDUAL ERRORS ARE REPORTED AND A SUMMARY OF THEM IS GIVEN AT
3288                                    ;;      THE END OF THIS TEST.
3289                                    ;;
3290                                    ;;      ALL ERRORS IN THIS TEST ARE REPORTED AND ANALYZED BY SUBROUTINE
3291                                    ;;      "DUALADR".
3292                                    ;;**************************************************************
3293  023136                            TST16:
3294  023136  000004                    SCOPE
3295  023140  012737  023342  001444    MOV     #TST17,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
3296                                                            ;TEST FOR ESCAPE ON PARITY ERRORS
3297  023146  004737  044254      20$:  JSR     PC,CLEANUP      ;INITIALIZE ERROR LOCATIONS
3298  023152  012737  023200  001110    MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
3299  023160  012705  172300            MOV     #KIPDR0,R5      ;PUT ADDRESS OF FIRST PDR IN R5
3300  023164  004737  044236            JSR     PC,CLRREG       ;CLEAR 8 REGISTERS POINTED TO BY R5
3301  023170  012700  172300            MOV     #KIPDR0,R0      ;PUT ADDRESS OF FIRST PDR IN R0
3302  023174  012701  000010            MOV     #10,R1          ;BRANCH COUNT IS 8 DECIMAL
3303  023200  011002                1$:  MOV     (R0),R2         ;READ PDR TO R2
3304  023202  001401                    BEQ     2$              ;BRANCH IF PDR IS 0
3305  023204  104014                    ERROR   14              ;PDR NOT ZERO
3306  023206  062700  000002        2$: ADD     #2,R0           ;POINT TO NEXT REGISTER
3307  023212  077106                    SOB     R1,1$           ;BRANCH BACK TO 1$ 7 TIMES
3308                                    ;;
3309                                    ;;  NOW START DUAL ADDRESSING TEST BY LOADING -1 INTO ONE
3310                                    ;;  REGISTER AND READING THE REST TO SEE ONLY THAT REGISTER
3311                                    ;;  IS NON-ZERO. (DROPPED BITS  WILL BE FOUND IN NEXT TEST.)
3312                                    ;;
3313  023214  012737  023226  001110        MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
3314  023222  012700  172300              MOV     #KIPDR0,R0      ;PUT ADDRESS OF FIRST PDR IS R0
3315  023226  012705  172300          3$: MOV     #KIPDR0,R5      ;LOAD STARTING ADDRESS INTO R5
3316  023232  004737  044236              JSR     PC,CLRREG       ;CLEAR 8 REGISTERS POINTED TO BY R5
3317  023236  012701  172316              MOV     #KIPDR7,R1      ;PUT KIPDR7 ADDRESS IN R1
3318  023242  012710  177777              MOV     #-1,(R0)        ;LOAD REGISTER UNDER TEST
3319  023246  005037  001176          4$: CLR     $TMP0           ;FLAG TO INDICATE THERE WAS A MATCH
3320  023252  011102                      MOV     (R1),R2         ;READ ALL REGISTERS
```

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3321   023254  001406                          BEQ     6$              ;BRANCH IF REGISTER IS 0
3322   023256  020001                          CMP     R0,R1           ;IS ADDRESS OF NON-ZERO REGISTER SAME
3323                                                                   ;AS THAT OF REGISTER UNDER TEST
3324   023260  001402                          BEQ     5$              ;BRANCH IF ADDRESSES MATCH
3325   023262  004737  044406                  JSR     PC,DUALADR      ;LOG AND REPORT ERRORS
3326   023266  005237  001176          5$:     INC     $TMP0           ;SET FLAG WHEN ADDRESSES MATCH
3327   023272  162701  000002          6$:     SUB     #2,R1           ;POINT TO NEXT REGISTER
3328   023276  022701  172300                  CMP     #KIPDR0,R1      ;SEE IF ALL REGISTERS HAVE BEEN READ
3329   023302  101761                          BLOS    4$              ;BRANCH IF MORE TO READ
3330   023304  062700  000002                  ADD     #2,R0           ;NOW LOAD NEXT REGISTER
3331   023310  022700  172316                  CMP     #KIPDR7,R0      ;SEE IF THERE ARE MORE REGISTERS TO TEST
3332   023314  103344                          BHIS    3$              ;BRANCH IF MORE REGISTERS TO TEST
3333   023316  012737  023146  001110          MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO START OF TEST
3334   023324  005737  001430                  TST     ERRCNT          ;SEE IF THERE WERE ANY ERRORS
3335   023330  001404                          BEQ     TST17           ;;BRANCH TO NEXT TEST IF NO ERRORS
3336   023332  013737  001430  001210          MOV     ERRCNT,$TMP5    ;SAVE NUMBER OF ERRORS FOR PDR OUT
3337   023340  104015                          ERROR   15              ;SUMMARY OF DUAL ADDRESSING ERRORS
3338
3339
3340                                   ;;*****************************************************************
3341                                   ;*TEST 17        DUAL ADDRESS USER PAGE DESCRIPTOR REGISTERS, ON LOADING
3342                                   ;;
3343                                   ;;      THIS TEST FIRST CLEARS ALL THE USER PAGE DESCRIPTOR REGISTERS
3344                                   ;;      AND CHECKS TO SEE THAT THEY EACH HOLD ZERO.  THEN, STARTING WITH
3345                                   ;;      DESCRIPTOR REGISTER ZERO, ONE REGISTER AT A TIME IS
3346                                   ;;      LOADED WITH A NEGATIVE ONE.  ALL USER DESCRIPTOR REGISTERS
3347                                   ;;      ARE NOW READ TO SEE THAT ONLY THE ONE UNDER TEST IS NON-ZERO.
3348                                   ;;      INDIVIDUAL ERRORS ARE REPORTED AND A SUMMARY OF THEM IS GIVEN AT
3349                                   ;;      THE END OF THIS TEST.
3350                                   ;;
3351                                   ;;      ALL ERRORS IN THIS TEST ARE REPORTED AND ANALYZED BY SUBROUTINE
3352                                   ;;      "DUALADR".
3353                                   ;;*****************************************************************
3354   023342                          TST17:
3355   023342  000004                          SCOPE
3356   023344  012737  023546  001444          MOV     #TST20,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
3357                                                                   ;TEST FOR ESCAPE ON PARITY ERRORS
3358   023352  004737  044254          20$:    JSR     PC,CLEANUP      ;INITIALIZE ERROR LOCATIONS
3359   023356  012737  023404  001110          MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
3360   023364  012705  177600                  MOV     #UIPDR0,R5      ;PUT ADDRESS OF FIRST PDR IN R5
3361   023370  004737  044236                  JSR     PC,CLRREG       ;CLEAR 8 REGISTERS POINTED TO BY R5
3362   023374  012700  177600                  MOV     #UIPDR0,R0      ;PUT ADDRESS OF FIRST PDR IN R0
3363   023400  012701  000010                  MOV     #10,R1          ;BRANCH COUNT IS 8 DECIMAL
3364   023404  011002                  1$:     MOV     (R0),R2         ;READ PDR TO R2
3365   023406  001401                          BEQ     2$              ;BRANCH IF PDR IS 0
3366   023410  104014                          ERROR   14              ;PDR NOT ZERO
3367   023412  062700  000002          2$:     ADD     #2,R0           ;POINT TO NEXT REGISTER
3368   023416  077106                          SOB     R1,1$           ;BRANCH BACK TO 1$ 7 TIMES
3369                                   ;;
3370                                   ;;  NOW START DUAL ADDRESSING TEST BY LOADING -1 INTO ONE
3371                                   ;;  REGISTER AND READING THE REST TO SEE ONLY THAT REGISTER
3372                                   ;;  IS NON-ZERO. (DROPPED BITS  WILL BE FOUND IN NEXT TEST.)
3373                                   ;;
3374   023420  012737  023432  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
3375   023426  012700  177600                  MOV     #UIPDR0,R0      ;PUT ADDRESS OF FIRST PDR IS R0
3376   023432  012705  177600          3$:     MOV     #UIPDR0,R5      ;LOAD STARTING ADDRESS INTO R5
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3377  023436  004737  044236                  JSR     PC,CLRREG       ;CLEAR 8 REGISTERS POINTED TO BY R5
3378  023442  012701  177616                  MOV     #UIPDR7,R1      ;PUT UIPDR7 ADDRESS IN R1
3379  023446  012710  177777                  MOV     #-1,(R0)        ;LOAD REGISTER UNDER TEST
3380  023452  005037  001176          4$:     CLR     $TMP0           ;FLAG TO INDICATE THERE WAS A MATCH
3381  023456  011102                          MOV     (R1),R2         ;READ ALL REGISTERS
3382  023460  001406                          BEQ     6$              ;BRANCH IF REGISTER IS 0
3383  023462  020001                          CMP     R0,R1           ;IS ADDRESS OF NON-ZERO REGISTER SAME
3384                                                                  ;AS THAT OF REGISTER UNDER TEST
3385  023464  001402                          BEQ     5$              ;BRANCH IF ADDRESSES MATCH
3386  023466  004737  044406                  JSR     PC,DUALADR      ;LOG AND REPORT ERRORS
3387  023472  005237  001176          5$:     INC     $TMP0           ;SET FLAG WHEN ADDRESSES MATCH
3388  023476  162701  000002          6$:     SUB     #2,R1           ;POINT TO NEXT REGISTER
3389  023502  022701  177600                  CMP     #UIPDR0,R1      ;SEE IF ALL REGISTERS HAVE BEEN READ
3390  023506  101761                          BLOS    4$              ;BRANCH IF MORE TO READ
3391  023510  062700  000002                  ADD     #2,R0           ;NOW LOAD NEXT REGISTER
3392  023514  022700  177616                  CMP     #UIPDR7,R0      ;SEE IF THERE ARE MORE REGISTERS TO TEST
3393  023520  103344                          BHIS    3$              ;BRANCH IF MORE REGISTERS TO TEST
3394  023522  012737  023352  001110          MOV     #20$,$LPERR     ;SET LOOP ON ERROR POINTER TO START OF TEST
3395  023530  005737  001430                  TST     ERRCNT          ;SEE IF THERE WERE ANY ERRORS
3396  023534  001404                          BEQ     TST20           ;;BRANCH TO NEXT TEST IF NO ERRORS
3397  023536  013737  001430  001210          MOV     ERRCNT,$TMP5    ;SAVE NUMBER OF ERRORS FOR PDR CUT
3398  023544  104015                          ERROR   15              ;SUMMARY OF DUAL ADDRESSING ERRORS
3399
3400                                  .SBTTL          TEST FOR BAD READ/WRITE BITS IN P.A.R.'S & P.D.R.'S
3401                                  ;*      THESE NEXT FOUR (4) TESTS CHECK FOR BAD BITS IN THE MEMORY CHIPS
3402                                  ;*      THAT MAKE UP THE PAR'S AND PDR'S.  THE REGISTERS ARE LOADED WITH
3403                                  ;*      ZERO AND MODIFIED BY "401" UNTIL 177777 IS REACHED IN EACH ONE
3404                                  ;*      (THE NUMBER 401 WAS CHOSEN FOR FASTER RUN-TIME).  THE BITS THAT
3405                                  ;*      ARE NOT IMPLEMENTED OR THAT ARE NOT READ/WRITE ARE MASKED OUT
3406                                  ;*      OF THE DATA COMPARE.  A LOG OF MULTIPLE ERRORS IS KEPT FOR EACH
3407                                  ;*      GROUP AND IT IS REPORTED AT THE CONCLUSION OF EACH TEST.
3408                                  ;*
3409                                  ;**********************************************************************
3410                                  ;*TEST 20       COUNT PATTERN IN KERNEL PAGE ADDRESS REGISTERS
3411                                  ;*
3412                                  ;*      THIS TEST RUNS A COUNT PATTERN THRU THE KERNEL PAGE ADDRESS
3413                                  ;*      REGISTERS.  SINCE BITS <15:12> ARE NOT IMPLEMENTED THEY ARE
3414                                  ;*      MASKED OUT OF THE DATA COMPARE.    THESE BITS ARE STILL SENT
3415                                  ;*      TO THE ADDRESS REGISTER TO FIND BAD ETCHES.  IF THE COUNT PATTERN
3416                                  ;*      DOES NOT MATCH THE DATA RECEVIED, THE REGISTER ADDRESS, DATA
3417                                  ;*      PATTERN, AND BAD DATA ARE REPORTED.  AT THE END OF THE TEST A
3418                                  ;*      SUMMARY OF THE ERRORS IS GIVEN.
3419                                  ;*
3420                                  ;*      ALL ERRORS FOUND BY THIS TEST ARE REPORTED AND ANALYZED BY
3421                                  ;*      SUBROUTINE "PARCOUNT".
3422                                  ;*
3423                                  ;**********************************************************************
3424  023546                          TST20:
3425  023546  000004                          SCOPE
3426  023550  012737  023700  001444          MOV     #TST21,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
3427                                                                  ;TEST FOR ESCAPE ON PARITY ERRORS
3428  023556  012737  000012  001212          MOV     #12,$TIMES      ;;DO 12 ITERATIONS
3429  023564  004737  044254          20$:    JSR     PC,CLEANUP      ;INITIALIZE ERROR LOCATIONS
3430  023570  012737  023604  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
3431  023576  005001                          CLR     R1              ;CLEAR REGISTER TO HOLD COUNT PATTERN
3432  023600  012700  172340          1$:     MOV     #KIPAR0,R0      ;PUT ADDRESS OF FIRST REGISTER IS R0
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```
3433  023604  010110                  2$:     MOV     R1,(R0)         ;LOAD COUNT INTO REGISTER
3434  023606  011002                          MOV     (R0),R2         ;READ REGISTER BACK TO R2
3435  023610  010104                          MOV     R1,R4           ;PUT PATTERN IS R4
3436  023612  042704  170000                  BIC     #170000,R4      ;CLEAR BITS NOT FOUND IN REGISTER.
3437  023616  020402                          CMP     R4,R2           ;SEE IF DATA MATCHES PATTERN
3438  023620  001402                          BEQ     3$              ;BRANCH IF DATA IS GOOD
3439  023622  004737  044462                  JSR     PC,FARCOUNT     ;LOG AND REPORT COUNT ERROR
3440  023626  062700  000002          3$:     ADD     #2,R0           ;POINT TO  NEXT REGISTER
3441  023632  022700  172356                  CMP     #KIPAR7,R0      ;SEE IF YOU PASSED THE KIPAR7 PAR
3442  023636  103362                          BHIS    2$              ;BRANCH IF MORE PAR''S TO TEST
3443  023640  022701  177777                  CMP     #177777,R1      ;SEE IF COUNT HAS REACHED 177777
3444  023644  001403                          BEQ     4$              ;BRANCH IF COUNT IS 177777
3445  023646  062701  000401                  ADD     #401,R1         ;INCREASE COUNT PATTERN
3446  023652  000752                          BR      1$              ;BRANCH TO CONTINUE TEST
3447  023654  012737  023564  001110  4$:     MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
3448  023662  005737  001430                  TST     ERRCNT          ;SEE IF THERE WERE ANY ERRORS
3449  023666  001404                          BEQ     TST21           ;;BRANCH TO NEXT TEST IF NO ERRORS
3450  023670  013737  001430  001210          MOV     ERRCNT,$TMPS    ;SAVE NUMBER OF ERRORS FOR TYPEOUT
3451  023676  104016                          ERROR   16              ;SUMMARY OF COUNT PATTERN FAILURES
3452
3453
3454                                  ;;*****************************************************************
3455                                  ;*TEST 21       COUNT PATTERN IN USER PAGE ADDRESS REGISTERS
3456                                  ;;
3457                                  ;;      THIS TEST RUNS A COUNT PATTERN THRU THE USER PAGE ADDRESS
3458                                  ;;      REGISTERS.  SINCE BITS <15:12> ARE NOT IMPLEMENTED THEY ARE
3459                                  ;*      MASKED OUT OF THE DATA COMPARE.  THESE BITS ARE STILL SENT
3460                                  ;*      TO THE ADDRESS REGISTER TO FIND BAD ETCHES.  IF THE COUNT PATTERN
3461                                  ;;      DOES NOT MATCH THE DATA RECEVIED, THE REGISTER ADDRESS, DATA
3462                                  ;;      PATTERN, AND BAD DATA ARE REPORTED.  AT THE END OF THE TEST A
3463                                  ;;      SUMMARY OF THE ERRORS IS GIVEN.
3464                                  ;;
3465                                  ;;      ALL ERRORS FOUND BY THIS TEST ARE REPORTED AND ANALYZED BY
3466                                  ;;      SUBROUTINE "PARCOUNT".
3467                                  ;;
3468                                  ;;*****************************************************************
3469  023700                          TST21:
3470  023700  000004                          SCOPE
3471  023702  012737  024032  001444          MOV     #TST22,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
3472                                                                  ;TEST FOR ESCAPE ON PARITY ERRORS
3473  023710  012737  000012  001212          MOV     #12,$TIMES      ;;DO 12 ITERATIONS
3474  023716  004737  044254          20$:    JSR     PC,CLEANUP      ;INITIALIZE ERROR LOCATIONS
3475  023722  012737  023736  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
3476  023730  005001                          CLR     R1              ;CLEAR REGISTER TO HOLD COUNT PATTERN
3477  023732  012700  177640          1$:     MOV     #UIPAR0,R0      ;PUT ADDRESS OF FIRST REGISTER IS R0
3478  023736  010110                  2$:     MOV     R1,(R0)         ;LOAD COUNT INTO REGISTER
3479  023740  011002                          MOV     (R0),R2         ;READ REGISTER BACK TO R2
3480  023742  010104                          MOV     R1,R4           ;PUT PATTERN IS R4
3481  023744  042704  170000                  BIC     #170000,R4      ;CLEAR BITS NOT FOUND IN REGISTER.
3482  023750  020402                          CMP     R4,R2           ;SEE IF DATA MATCHES PATTERN
3483  023752  001402                          BEQ     3$              ;BRANCH IF DATA IS GOOD
3484  023754  004737  044462                  JSR     PC,PARCOUNT     ;LOG AND REPORT COUNT ERROR
3485  023760  062700  000002          3$:     ADD     #2,R0           ;POINT TO  NEXT REGISTER
3486  023764  022700  177656                  CMP     #UIPAR7,R0      ;SEE IF YOU PASSED THE UIPAR7 PAR
3487  023770  103362                          BHIS    2$              ;BRANCH IF MORE PAR''S TO TEST
3488  023772  022701  177777                  CMP     #177777,R1      ;SEE IF COUNT HAS REACHED 177777
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3489  023776  001403                          BEQ     4$              ;BRANCH IF COUNT IS 177777
3490  024000  062701  000401                  ADD     #401,R1         ;INCREASE COUNT PATTERN
3491  024004  000752                          BR      1$              ;BRANCH TO CONTINUE TEST
3492  024006  012737  023716  001110  4$:     MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
3493  024014  005737  001430                  TST     ERRCNT          ;SEE IF THERE WERE ANY ERRORS
3494  024020  001404                          BEQ     TST22           ;;BRANCH TO NEXT TEST IF NO ERRORS
3495  024022  013737  001430  001210          MOV     ERRCNT,$TMP5    ;SAVE NUMBER OF ERRORS FOR TYPEOUT
3496  024030  104016                          ERROR   16              ;SUMMARY OF COUNT PATTERN FAILURES
3497
3498                                  ;;**************************************************************
3499                                  ;*TEST 22        COUNT PATTERN IN KERNEL PAGE DESCRIPTOR REGISTERS
3500                                  ;*
3501                                  ;*      THIS TEST RUNS A COUNT PATTERN THRU THE KERNEL PAGE DESCRIPTOR
3502                                  ;*      REGISTERS.  SINCE BITS <15>,<07>,<05:04> AND <00> ARE NOT IMPLEMENTED
3503                                  ;*      AND BITS <06> CANNOT BE SET BY DIRECT LOAD, THEY ARE MASKED
3504                                  ;*      OUT OF THE DATA COMPARE.  THESE BITS ARE STILL SENT TO THE
3505                                  ;*      DESCRIPTOR REGISTER TO FIND BAD ETCHES.  IF THE COUNT PATTERN
3506                                  ;*      DOES NOT MATCH THE DATA RECEVIED, THE REGISTER ADDRESS, DATA
3507                                  ;*      PATTERN, AND BAD DATA ARE REPORTED.  AT THE END OF THE TEST A
3508                                  ;*      SUMMARY OF THE ERRORS IS GIVEN.
3509                                  ;*
3510                                  ;;**************************************************************
3511  024032                          TST22:
3512  024032  000004                          SCOPE
3513  024034  012737  024164  001444          MOV     #TST23,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
3514                                                                  ;TEST FOR ESCAPE ON PARITY ERRORS
3515  024042  012737  000012  001212          MOV     #12,$TIMES      ;;DO 12 ITERATIONS
3516  024050  004737  044254          20$:    JSR     PC,CLEANUP      ;INITIALIZE ERROR LOCATIONS
3517  024054  012737  024070  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
3518  024062  005001                          CLR     R1              ;CLEAR REGISTER TO HOLD COUNT PATTERN
3519  024064  012700  172300          1$:     MOV     #KIPDR0,R0      ;PUT ADDRESS OF FIRST REGISTER IS R0
3520  024070  010110                  2$:     MOV     R1,(R0)         ;LOAD COUNT INTO REGISTER
3521  024072  011002                          MOV     (R0),R2         ;READ REGISTER BACK TO R2
3522  024074  010104                          MOV     R1,R4           ;PUT PATTERN IS R4
3523  024076  042704  100361                  BIC     #100361,R4      ;CLEAR BITS NOT FOUND IN REGISTER.
3524  024102  020402                          CMP     R4,R2           ;SEE IF DATA MATCHES PATTERN
3525  024104  001402                          BEQ     3$              ;BRANCH IF DATA IS GOOD
3526  024106  004737  044462                  JSR     PC,PARCOUNT     ;LOG AND REPORT COUNT ERROR
3527  024112  062700  000002          3$:     ADD     #2,R0           ;POINT TO  NEXT REGISTER
3528  024116  022700  172316                  CMP     #KIPDR7,R0      ;SEE IF YOU PASSED THE KIPDR7 PDR
3529  024122  103362                          BHIS    2$              ;BRANCH IF MORE PDR''S TO TEST
3530  024124  022701  177777                  CMP     #177777,R1      ;SEE IF COUNT HAS REACHED 177777
3531  024130  001403                          BEQ     4$              ;BRANCH IF COUNT IS 177777
3532  024132  062701  000401                  ADD     #401,R1         ;INCREASE COUNT PATTERN
3533  024136  000752                          BR      1$              ;BRANCH TO CONTINUE TEST
3534  024140  012737  024050  001110  4$:     MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
3535  024146  005737  001430                  TST     ERRCNT          ;SEE IF THERE WERE ANY ERRORS
3536  024152  001404                          BEQ     TST23           ;;BRANCH TO NEXT TEST IF NO ERRORS
3537  024154  013737  001430  001210          MOV     ERRCNT,$TMP5    ;SAVE NUMBER OF ERRORS FOR TYPEOUT
3538  024162  104016                          ERROR   16              ;SUMMARY OF COUNT PATTERN FAILURES
3539
3540
3541                                  ;;**************************************************************
3542                                  ;*TEST 23        COUNT PATTERN IN USER PAGE DESCRIPTOR REGISTERS
3543                                  ;;
3544                                  ;;      THIS TEST RUNS A COUNT PATTERN THRU THE USER PAGE DESCRIPTOR
```

```
                                ;;      REGISTERS.  SINCE BITS <15>,<07>,<05:04>, AND <00> ARE NOT IMPLEMENTED
                                ;;      AND BITS <06> CANNOT BE SET BY DIRECT LOAD, THEY ARE MASKED
                                ;;      OUT OF THE DATA COMPARE.  THESE BITS ARE STILL SENT TO THE
                                ;;      DESCRIPTOR REGISTER TO FIND BAD ETCHES.  IF THE COUNT PATTERN
                                ;;      DOES NOT MATCH THE DATA RECEVIED, THE REGISTER ADDRESS, DATA
                                ;;      PATTERN, AND BAD DATA ARE REPORTED.  AT THE END OF THE TEST A
                                ;;      SUMMARY OF THE ERRORS IS GIVEN.
                                ;;
                                ;;*****************************************************************
024164                          TST23:
                                        SCOPE
024164  000004
024166  012737  024316  001444         MOV     #TST24,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
                                                                ;TEST FOR ESCAPE ON PARITY ERRORS
024174  012737  000012  001212         MOV     #12,$TIMES      ;;DO 12 ITERATIONS
024202  004737  044254         20$:    JSR     PC,CLEANUP      ;INITIALIZE ERROR LOCATIONS
024206  012737  024222  001110         MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
024214  005001                         CLR     R1              ;CLEAR REGISTER TO HOLD COUNT PATTERN
024216  012700  177600         1$:     MOV     #UIPDR0,R0      ;PUT ADDRESS OF FIRST REGISTER IS R0
024222  010110         2$:     MOV     R1,(R0)         ;LOAD COUNT INTO REGISTER
024224  011002                         MOV     (R0),R2         ;READ REGISTER BACK TO R2
024226  010104                         MOV     R1,R4           ;PUT PATTERN IS R4
024230  042704  100361                 BIC     #100361,R4      ;CLEAR BITS NOT FOUND IN REGISTER.
024234  020402                         CMP     R4,R2           ;SEE IF DATA MATCHES PATTERN
024236  001402                         BEQ     3$              ;BRANCH IF DATA IS GOOD
024240  004737  044462                 JSR     PC,PARCOUNT     ;LOG AND REPORT COUNT ERROR
024244  062700  000002         3$:     ADD     #2,R0           ;POINT TO  NEXT REGISTER
024250  022700  177616                 CMP     #UIPDR7,R0      ;SEE IF YOU PASSED THE UIPDR7 PDR
024254  103362                         BHIS    2$              ;BRANCH IF MORE PDR''S TO TEST
024256  022701  177777                 CMP     #177777,R1      ;SEE IF COUNT HAS REACHED 177777
024262  001403                         BEQ     4$              ;BRANCH IF COUNT IS 177777
024264  062701  000401                 ADD     #401,R1         ;INCREASE COUNT PATTERN
024270  000752                         BR      1$              ;BRANCH TO CONTINUE TEST
024272  012737  024202  001110 4$:     MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
024300  005737  001430                 TST     ERRCNT          ;SEE IF THERE WERE ANY ERRORS
024304  001404                         BEQ     TST24           ;;BRANCH TO NEXT TEST IF NO ERRORS
024306  013737  001430  001210         MOV     ERRCNT,$TMP5    ;SAVE NUMBER OF ERRORS FOR TYPEOUT
024314  104016                         ERROR   16              ;SUMMARY OF COUNT PATTERN FAILURES

                                .SBTTL          TEST FOR CORRECT BYTE ADDRESSING OF P.A.R.'S & P.D.R.'S
                                ;*      THESE NEXT FOUR (4) TESTS ARE USED TO TEST THE LOGIC THAT
                                ;*      ALLOWS BYTE ADDRESSING OF THE PAR'S AND PDR'S.  IN EACH
                                ;*      CASE REGISTER 0 IS USED, SINCE IT IS REALLY
                                ;*      THE WRITE PULSE TO THE REGISTER SET THAT IS BEING TESTED.
                                ;*      IT IS ASSUMED THAT IF ONE REGISTER OF A GROUP FUNCTIONS
                                ;*      PROPERLY THAT THEY ALL WILL, SINCE ALL REGISTERS HAVE BEEN
                                ;*      BIT TESTED EARLIER.
                                ;*
                                ;*****************************************************************
                                ;*TEST 24       BYTE ADDRESSING OF KERNEL PAGE ADDRESS REGISTERS
                                ;*
                                ;*      THIS TEST CHECKS THE 'WRITE PAR LOW' AND 'WRITE PAR HIGH'
                                ;*      SIGNAL GENERATION FOR KERNEL PAGE ADDRESS REGISTERS.
                                ;*      BOTH SIGNALS ARE CONTROLLED BY THE WRITE REG. DECODE LOGIC.
                                ;*
                                ;*****************************************************************
024316                          TST24:
```

```
3601   024316  000004                          SCOPE
3602   024320  012737  024430  001444          MOV     #TST25,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
3603                                                                   ;TEST FOR ESCAPE ON PARITY ERRORS
3604   024326  012737  024344  001110  20$:    MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
3605   024334  012702  000016                  MOV     #16,R2          ;PUT EXPECTED DATA IN R2
3606   024340  012700  172340                  MOV     #KIPAR0,R0      ;PUT ADDRESS OF REGISTER IN R0
3607   024344  005037  172340          11$:    CLR     KIPAR0          ;CLEAR THE REGISTER UNDER TEST
3608   024350  112710  172016                  MOVB    #172016,(R0)    ;LOAD LOWER BYTE OF REGISTER
3609   024354  013701  172340                  MOV     KIPAR0,R1       ;READ REGISTER INTO R1
3610   024360  020102                          CMP     R1,R2           ;SEE IF ONLY LOWER BYTE WAS WRITTEN
3611   024362  001401                          BEQ     1$              ;BRANCH IF DATA MATCHES
3612   024364  104017                          ERROR   17              ;DIDN'T LOAD CORRECT BYTE
3613   024366  012737  024404  001110  1$:     MOV     #12$,$LPERR     ;SET LOOP ON ERROR POINTER TO 12$
3614   024374  012700  172341                  MOV     #KIPAR0+1,R0    ;POINT TO UPPER BYTE OF REGISTER
3615   024400  012702  007416                  MOV     #007416,R2      ;LOAD EXPECTED DATA IN R2
3616   024404  112710  000017          12$:    MOVB    #17,(R0)        ;WRITE THE UPPER BYTE OF REGISTER
3617   024410  013701  172340                  MOV     KIPAR0,R1       ;READ REGISTER INTO R1
3618   024414  020102                          CMP     R1,R2           ;SEE IF REGISTER HOLDS CORRECT DATA
3619   024416  001401                          BEQ     2$              ;BRANCH TO EXIT IF DATA RIGHT
3620   024420  104017                          ERROR   17              ;DIDN'T LOAD CORRECT BYTE
3621
3622   024422  012737  024326  001110  2$:     MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
3623
3624
3625
3626
3627                                   ;;*****************************************************************
3628                                   ;*TEST 25       BYTE ADDRESSING OF USER PAGE ADDRESS REGISTERS
3629                                   ;;
3630                                   ;;      THIS TEST CHECKS THE 'WRITE PAR LOW' AND 'WRITE PAR HIGH'
3631                                   ;;      SIGNAL GENERATION FOR USER PAGE ADDRESS REGISTERS.
3632                                   ;;      BOTH SIGNALS ARE CONTROLLED BY THE WRITE REG. DECODE LOGIC.
3633                                   ;;
3634                                   ;;*****************************************************************
3635   024430                          TST25:
3636   024430  000004                          SCOPE
3637   024432  012737  024542  001444          MOV     #TST26,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
3638                                                                   ;TEST FOR ESCAPE ON PARITY ERRORS
3639   024440  012737  024456  001110  20$:    MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
3640   024446  012702  000016                  MOV     #16,R2          ;PUT EXPECTED DATA IN R2
3641   024452  012700  177640                  MOV     #UIPAR0,R0      ;PUT ADDRESS OF REGISTER IN R0
3642   024456  005037  177640          11$:    CLR     UIPAR0          ;CLEAR THE REGISTER UNDER TEST
3643   024462  112710  172016                  MOVB    #172016,(R0)    ;LOAD LOWER BYTE OF REGISTER
3644   024466  013701  177640                  MOV     UIPAR0,R1       ;READ REGISTER INTO R1
3645   024472  020102                          CMP     R1,R2           ;SEE IF ONLY LOWER BYTE WAS WRITTEN
3646   024474  001401                          BEQ     1$              ;BRANCH IF DATA MATCHES
3647   024476  104017                          ERROR   17              ;DIDN'T LOAD CORRECT BYTE
3648   024500  012737  024516  001110  1$:     MOV     #12$,$LPERR     ;SET LOOP ON ERROR POINTER TO 12$
3649   024506  012700  177641                  MOV     #UIPAR0+1,R0    ;POINT TO UPPER BYTE OF REGISTER
3650   024512  012702  007416                  MOV     #007416,R2      ;LOAD EXPECTED DATA IN R2
3651   024516  112710  000017          12$:    MOVB    #17,(R0)        ;WRITE THE UPPER BYTE OF REGISTER
3652   024522  013701  177640                  MOV     UIPAR0,R1       ;READ REGISTER INTO R1
3653   024526  020102                          CMP     R1,R2           ;SEE IF REGISTER HOLDS CORRECT DATA
3654   024530  001401                          BEQ     2$              ;BRANCH TO EXIT IF DATA RIGHT
3655   024532  104017                          ERROR   17              ;DIDN'T LOAD CORRECT BYTE
3656
```

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3657  024534  012737  024440  001110  2$:     MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
3658
3659
3660                                          ;;*****************************************************************
3661                                          ;*TEST 26       BYTE ADDRESSING OF KERNEL PAGE DESCRIPTOR REGISTERS
3662                                          ;;
3663                                          ;;      THIS TEST CHECKS THE 'WRITE PDR LOW' AND 'WRITE PDR HIGH'
3664                                          ;;      SIGNAL GENERATION FOR KERNEL PAGE ADDRESS REGISTERS.
3665                                          ;;      BOTH SIGNALS ARE CONTROLLED BY THE WRITE REG. DECODE LOGIC.
3666                                          ;;
3667                                          ;;*****************************************************************
3668  024542                                  TST26:
3669  024542  000004                         SCOPE
3670  024544  012737  024654  001444          MOV     #TST27,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
3671                                                                  ;TEST FOR ESCAPE ON PARITY ERRORS
3672  024552  012737  024570  001110  20$:    MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
3673  024560  012702  000016                  MOV     #16,R2          ;PUT EXPECTED DATA IN R2
3674  024564  012700  172300                  MOV     #KIPDR0,R0      ;PUT ADDRESS OF REGISTER IN R0
3675  024570  005037  172300          11$:    CLR     KIPDR0          ;CLEAR THE REGISTER UNDER TEST
3676  024574  112710  172016                  MOVB    #172016,(R0)    ;LOAD LOWER BYTE OF REGISTER
3677  024600  013701  172300                  MOV     KIPDR0,R1       ;READ REGISTER INTO R1
3678  024604  020102                          CMP     R1,R2           ;SEE IF ONLY LOWER BYTE WAS WRITTEN
3679  024606  001401                          BEQ     1$              ;BRANCH IF DATA MATCHES
3680  024610  104017                          ERROR   17              ;DIDN'T LOAD CORRECT BYTE
3681  024612  012737  024630  001110  1$:     MOV     #12$,$LPERR     ;SET LOOP ON ERROR POINTER TO 12$
3682  024620  012700  172301                  MOV     #KIPDR0+1,R0    ;POINT TO UPPER BYTE OF REGISTER
3683  024624  012702  007416                  MOV     #007416,R2      ;LOAD EXPECTED DATA IN R2
3684  024630  112710  000017          12$:    MOVB    #17,(R0)        ;WRITE THE UPPER BYTE OF REGISTER
3685  024634  013701  172300                  MOV     KIPDR0,R1       ;READ REGISTER INTO R1
3686  024640  020102                          CMP     R1,R2           ;SEE IF REGISTER HOLDS CORRECT DATA
3687  024642  001401                          BEQ     2$              ;BRANCH TO EXIT IF DATA RIGHT
3688  024644  104017                          ERROR   17              ;DIDN'T LOAD CORRECT BYTE
3689
3690  024646  012737  024552  001110  2$:     MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
3691
3692
3693
3694
3695                                          ;;*****************************************************************
3696                                          ;*TEST 27       BYTE ADDRESSING OF USER PAGE DESCRIPTOR REGISTERS
3697                                          ;;
3698                                          ;;      THIS TEST CHECKS THE 'WRITE PDR LOW' AND 'WRITE PDR HIGH'
3699                                          ;;      SIGNAL GENERATION FOR USER PAGE ADDRESS REGISTERS.
3700                                          ;;      BOTH SIGNALS ARE CONTROLLED BY THE WRITE REG. DECODE LOGIC.
3701                                          ;;
3702                                          ;;*****************************************************************
3703  024654                                  TST27:
3704  024654  000004                         SCOPE
3705  024656  012737  024766  001444          MOV     #TST30,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
3706                                                                  ;TEST FOR ESCAPE ON PARITY ERRORS
3707  024664  012737  024702  001110  20$:    MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
3708  024672  012702  000016                  MOV     #16,R2          ;PUT EXPECTED DATA IN R2
3709  024676  012700  177600                  MOV     #UIPDR0,R0      ;PUT ADDRESS OF REGISTER IN R0
3710  024702  005037  177600          11$:    CLR     UIPDR0          ;CLEAR THE REGISTER UNDER TEST
3711  024706  112710  172016                  MOVB    #172016,(R0)    ;LOAD LOWER BYTE OF REGISTER
3712  024712  013701  177600                  MOV     UIPDR0,R1       ;READ REGISTER INTO R1
```

```
3713  024716  020102                          CMP     R1,R2           ;SEE IF ONLY LOWER BYTE WAS WRITTEN
3714  024720  001401                          BEQ     1$              ;BRANCH IF DATA MATCHES
3715  024722  104017                          ERROR   17              ;DIDN'T LOAD CORRECT BYTE
3716  024724  012737  024742  001110  1$:     MOV     #12$,$LPERR     ;SET LOOP ON ERROR POINTER TO 12$
3717  024732  012700  177601                  MOV     #UIPDR0+1,R0    ;POINT TO UPPER BYTE OF REGISTER
3718  024736  012702  007416                  MOV     #007416,R2      ;LOAD EXPECTED DATA IN R2
3719  024742  112710  000017          12$:    MOVB    #17,(R0)        ;WRITE THE UPPER BYTE OF REGISTER
3720  024746  013701  177600                  MOV     UIPDR0,R1       ;READ REGISTER INTO R1
3721  024752  020102                          CMP     R1,R2           ;SEE IF REGISTER HOLDS CORRECT DATA
3722  024754  001401                          BEQ     2$              ;BRANCH TO EXIT IF DATA RIGHT
3723  024756  104017                          ERROR   17              ;DIDN'T LOAD CORRECT BYTE
3724
3725  024760  012737  024664  001110  2$:     MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
3726
3727
3728                                  .SBTTL          DUAL ADDRESSING BETWEEN GROUPS OF REGISTERS
3729                                  ;;**************************************************************
3730                                  ;*TEST 30        DUAL ADDRESSING FOR ALL PAR'S AND PDR'S
3731                                  ;*
3732                                  ;*      THIS TEST WILL ENSURE THAT THERE IS NO DUAL ADDRESSING BETWEEN
3733                                  ;*      GROUPS OF PAR'S AND PDR'S.  THAT IS, WHEN YOU REFERENCE A KERNEL
3734                                  ;*      PAR YOU ARE REALLY REFERENCING THAT PAR.  FIRST EACH
3735                                  ;*      PAR0 OR PDR0 IS LOADED WITH A UNIQUE NUMBER 0-6 AND
3736                                  ;*      THEN THEY ARE EACH CHECKED FOR THE CORRECT DATA.
3737                                  ;*      EACH GROUP HAS ALREADY BEEN CHECKED FOR DUAL ADDRESSING WITHIN
3738                                  ;*      ITS OWN GROUP, SO ONLY ONE REGISTER FROM EACH GROUP NEEDS TO
3739                                  ;*      BE TESTED HERE.
3740                                  ;*
3741                                  ;;**************************************************************
3742  024766                          TST30:
3743  024766  000004                          SCOPE
3744  024770  012737  025070  001444          MOV     #TST31,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
3745                                                                  ;TEST FOR ESCAPE ON PARITY ERRORS
3746  024776  012737  025012  001110  20$:     MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
3747  025004  005000                          CLR     R0              ;THIS WILL HOLD THE INDEX OF EACH REGISTER
3748                                                                  ;AND THE COUNT LOADED
3749  025006  012704  000004                  MOV     #4,R4           ;THIS IS THE NUMBER OF TIMES TO DO THIS LOOP
3750  025012  010070  001450          1$:     MOV     R0,@PARTAB(R0)  ;LOAD PAR OR PDR WITH INDEX NUMBER
3751  025016  062700  000002                  ADD     #2,R0           ;CHANGE INDEX TO POINT TO NEXT REGISTER
3752  025022  077405                          SOB     R4,1$           ;BRANCH BACK 3 TIMES
3753  025024  012704  000004                  MOV     #4,R4           ;DO NEXT LOOP 4 TIMES ALSO
3754  025030  012737  025042  001110          MOV     #10$,$LPERR     ;SET LOOP ON ERROR POINTER TO 10$
3755  025036  162700  000002          2$:     SUB     #2,R0           ;ADJUST INDEX FOR REGISTER DESIRED
3756  025042  017001  001450          10$:    MOV     @PARTAB(R0),R1  ;READ PAR OR PDR INTO R1
3757  025046  020001                          CMP     R0,R1           ;SEE IF INDEX EQUALS DATA
3758  025050  001403                          BEQ     3$              ;BRANCH IFCORRECT REGISTER WAS READ.
3759  025052  016002  001450                  MOV     PARTAB(R0),R2   ;SAVE ADDRESS OF BAD REGISTER
3760  025056  104030                          ERROR   30              ;DUAL ADDRESSING
3761  025060  077412                  3$:     SOB     R4,2$           ;BRANCH BACK 3 TIMES
3762  025062  012737  024776  001110          MOV     #20$,$LPERR     ;SET LOOP ON ERROR POINTER TO START OF TEST
3763
3764
3765                                  .SBTTL  ************ ENTRY POINT 4 --- STARTING ADDRESS 214 ************
3766                                  .SBTTL  ****************** RELOCATION AND ADDER TESTS ******************
3767                                  ;*
3768                                  ;*      THIS GROUP OF TESTS CHECKS MEMORY MANAGEMENT'S RELOCATION ADDER
```

```
3769                                    ;*      FIRST USING DESTINATION ONLY RELOCATION, THEN WITH FULL 18-BIT
3770                                    ;*      RELOCATION .
3771                                    ;*
3772
3773
3774                                    ;;*****************************************************************
3775                                    ;*TEST 31       18-BIT MAPPING ADDER TESTING
3776                                    ;*
3777                                    ;*      THIS TEST USES 'DESTINATION ONLY' RELOCATION TO CHECK THE
3778                                    ;*      FULL ADD PROPERTIES OF THE RELOCATION ADDER.  TWELVE PAIRS
3779                                    ;*      OF NUMBERS ARE ADDED, GENERATING PHYSICAL ADDRESSES ABOVE
3780                                    ;*      12K.
3781                                    ;*
3782                                    ;;*****************************************************************
3783  025070                            TST31:
3784  025070  000004                           SCOPE
3785  025072  012737  026632  001444           MOV     #TST32,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
3786                                                                   ;TEST FOR ESCAPE ON PARITY ERRORS
3787
3788                                    ;       THE FOLLOWING CODE WILL CLEAR ALL PAR'S AND PDR'S SO THAT
3789                                    ;       THE RELOCATION ADDERS CAN BE CHECKED, ONLY THE KERNEL
3790                                    ;       PDR'S AND PAR'S WILL BE MAPPED RESIDENT AND READ WRITE.
3791                                    ;
3792  025100                            ENTPT4:
3793  025100  012737  025162  001110           MOV     #20$,$LPERR     ;SET LOOP ON ERROR POINTER TO 20$
3794  025106  012737  000031  001102           MOV     #31,$TSTNM      ;LOAD TEST NUMBER INTO MEMORY
3795  025114  013777  001102  154020           MOV     $TSTNM,@DISPLAY ;DISPLAY TEST NUMBER FOR THIS TEST
3796  025122  012705  172300                   MOV     #KIPDR0,R5      ;PUT ADDRESS OF KIPDR0 IN R5
3797  025126  004737  044236                   JSR     PC,CLRREG       ;CLEAR KERNEL PDR'S
3798  025132  012705  172340                   MOV     #KIPAR0,R5      ;PUT ADDRESS OF KIPAR0 IN R5
3799  025136  004737  044236                   JSR     PC,CLRREG       ;CLEAR KERNEL PAR'S
3800  025142  012705  177600                   MOV     #UIPDR0,R5      ;PUT ADDRESS OF UIPDR0 IN R5
3801  025146  004737  044236                   JSR     PC,CLRREG       ;CLEAR USER PDR'S
3802  025152  012705  177640                   MOV     #UIPAR0,R5      ;PUT ADDRESS OF UIPAR0 IN R5
3803  025156  004737  044236                   JSR     PC,CLRREG       ;CLEAR USER PAR'S
3804  025162  012700  077406           20$:    MOV     #77406,R0       ;MAKE KERNEL I PAGES 4K, R/W, EXPAND UP
3805  025166  012702  000010                   MOV     #10,R2          ;SET COUNT TO LOAD 8 ADDRESSES
3806  025172  012701  172300                   MOV     #KIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
3807  025176  010021                   64$:    MOV     R0,(R1)+        ;LOAD R0 INTO PDR ADDRESSED BY R1
3808  025200  077202                           SOB     R2,64$          ;BRANCH BACK TO 64$ IF R2 IS NOT ZERO
3809  025202  012737  000000  172340           MOV     #000,KIPAR0     ;MAP PAGE 0 TO 0 - 4K
3810  025210  012737  000200  172342           MOV     #200,KIPAR1     ;MAP PAGE 1 TO 4K - 8K
3811  025216  012737  000400  172344           MOV     #400,KIPAR2     ;MAP PAGE 2 TO 8K - 12K
3812  025224  012737  000600  172346           MOV     #600,KIPAR3     ;MAP PAGE 3 TO 12K - 16K
3813  025232  012737  007600  172356           MOV     #7600,KIPAR7    ;MAP PAGE 7 TO I/O PAGE
3814  025240  012737  025306  001110           MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
3815  025246  013737  060000  001176           MOV     @#60000,$TMP0   ;SAVE DATA AT TEST LOCATION
3816  025254  012737  000600  172350           MOV     #600,@#KIPAR4   ;LOAD PAR4 WITH 600
3817  025262  012737  000600  001200           MOV     #600,$TMP1      ;SAVE 600 FOR ERROR REPORT
3818  025270  012737  060000  001202           MOV     #60000,$TMP2    ;SAVE 60000 FOR ERROR REPORT
3819  025276  012700  100000                   MOV     #100000,R0      ;PUT VIRTUAL ADDRESS IN R0
3820  025302  012701  125200                   MOV     #125200,R1      ;PUT DATA PATTERN IN R1
3821  025306  052737  000400  177572   1$:     BIS     #BIT8,@#MMR0    ;TURN ON DESTINATION ONLY RELOCATION
3822  025314  010110                           MOV     R1,(R0)         ;TRY TO LOAD DATA PATTERN INTO 60000
3823  025316  013702  060000                   MOV     @#60000,R2      ;READ (60000) INTO R2
3824  025322  000005                           RESET                   ;CLEAR MMR0
```

```
3825  025324  020102                          CMP     R1,R2           ;SEE IF DATA MATCHES PATTERN
3826  025326  001401                          BEQ     2$              ;BRANCH IF DATA MATCHES
3827  025330  104031                          ERROR   31              ;RELOCATION FAILED
3828  025332  013737  001176  060000  2$:     MOV     $TMP0,@#60000   ;RESTORE ORIGINAL DATA TO TEST LOCATION
3829  025340  012737  025406  001110          MOV     #7$,$LPERR      ;SET LOOP ON ERROR POINTER TO 7$
3830  025346  013737  062000  001176          MOV     @#62000,$TMP0   ;SAVE DATA AT TEST LOCATION
3831  025354  012737  000610  172350          MOV     #610,@#KIPAR4   ;LOAD PAR4 WITH 610
3832  025362  012737  000610  001200          MOV     #610,$TMP1      ;SAVE 610 FOR ERROR REPORT
3833  025370  012737  062000  001202          MOV     #62000,$TMP2    ;SAVE 62000 FOR ERROR REPORT
3834  025376  012700  101000                  MOV     #101000,R0      ;PUT VIRTUAL ADDRESS IN R0
3835  025402  012701  125203                  MOV     #125203,R1      ;PUT DATA PATTERN IN R1
3836  025406  052737  000400  177572  7$:     BIS     #BIT8,@#MMR0    ;TURN ON DESTINATION ONLY RELOCATION
3837  025414  010110                          MOV     R1,(R0)         ;TRY TO LOAD DATA PATTERN INTO 62000
3838  025416  013702  062000                  MOV     @#62000,R2      ;READ (62000) INTO R2
3839  025422  000005                          RESET                   ;CLEAR MMR0
3840  025424  020102                          CMP     R1,R2           ;SEE IF DATA MATCHES PATTERN
3841  025426  001401                          BEQ     8$              ;BRANCH IF DATA MATCHES
3842  025430  104031                          ERROR   31              ;RELOCATION FAILED
3843  025432  013737  001176  062000  8$:     MOV     $TMP0,@#62000   ;RESTORE ORIGINAL DATA TO TEST LOCATION
3844  025440  012737  025506  001110          MOV     #9$,$LPERR      ;SET LOOP ON ERROR POINTER TO 9$
3845  025446  013737  062000  001176          MOV     @#62000,$TMP0   ;SAVE DATA AT TEST LOCATION
3846  025454  012737  000514  172350          MOV     #514,@#KIPAR4   ;LOAD PAR4 WITH 514
3847  025462  012737  000514  001200          MOV     #514,$TMP1      ;SAVE 514 FOR ERROR REPORT
3848  025470  012737  062000  001202          MOV     #62000,$TMP2    ;SAVE 62000 FOR ERROR REPORT
3849  025476  012700  110400                  MOV     #110400,R0      ;PUT VIRTUAL ADDRESS IN R0
3850  025502  012701  125204                  MOV     #125204,R1      ;PUT DATA PATTERN IN R1
3851  025506  052737  000400  177572  9$:     BIS     #BIT8,@#MMR0    ;TURN ON DESTINATION ONLY RELOCATION
3852  025514  010110                          MOV     R1,(R0)         ;TRY TO LOAD DATA PATTERN INTO 62000
3853  025516  013702  062000                  MOV     @#62000,R2      ;READ (62000) INTO R2
3854  025522  000005                          RESET                   ;CLEAR MMR0
3855  025524  020102                          CMP     R1,R2           ;SEE IF DATA MATCHES PATTERN
3856  025526  001401                          BEQ     10$             ;BRANCH IF DATA MATCHES
3857  025530  104031                          ERROR   31              ;RELOCATION FAILED
3858  025532  013737  001176  062000  10$:    MOV     $TMP0,@#62000   ;RESTORE ORIGINAL DATA TO TEST LOCATION
3859  025540  012737  025606  001110          MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
3860  025546  013737  062000  001176          MOV     @#62000,$TMP0   ;SAVE DATA AT TEST LOCATION
3861  025554  012737  000504  172350          MOV     #504,@#KIPAR4   ;LOAD PAR4 WITH 504
3862  025562  012737  000504  001200          MOV     #504,$TMP1      ;SAVE 504 FOR ERROR REPORT
3863  025570  012737  062000  001202          MOV     #62000,$TMP2    ;SAVE 62000 FOR ERROR REPORT
3864  025576  012700  111400                  MOV     #111400,R0      ;PUT VIRTUAL ADDRESS IN R0
3865  025602  012701  125205                  MOV     #125205,R1      ;PUT DATA PATTERN IN R1
3866  025606  052737  000400  177572  11$:    BIS     #BIT8,@#MMR0    ;TURN ON DESTINATION ONLY RELOCATION
3867  025614  010110                          MOV     R1,(R0)         ;TRY TO LOAD DATA PATTERN INTO 62000
3868  025616  013702  062000                  MOV     @#62000,R2      ;READ (62000) INTO R2
3869  025622  000005                          RESET                   ;CLEAR MMR0
3870  025624  020102                          CMP     R1,R2           ;SEE IF DATA MATCHES PATTERN
3871  025626  001401                          BEQ     12$             ;BRANCH IF DATA MATCHES
3872  025630  104031                          ERROR   31              ;RELOCATION FAILED
3873  025632  013737  001176  062000  12$:    MOV     $TMP0,@#62000   ;RESTORE ORIGINAL DATA TO TEST LOCATION
3874  025640  012737  025706  001110          MOV     #13$,$LPERR     ;SET LOOP ON ERROR POINTER TO 13$
3875  025646  013737  062000  001176          MOV     @#62000,$TMP0   ;SAVE DATA AT TEST LOCATION
3876  025654  012737  000556  172350          MOV     #556,@#KIPAR4   ;LOAD PAR4 WITH 556
3877  025662  012737  000556  001200          MOV     #556,$TMP1      ;SAVE 556 FOR ERROR REPORT
3878  025670  012737  062000  001202          MOV     #62000,$TMP2    ;SAVE 62000 FOR ERROR REPORT
3879  025676  012700  104200                  MOV     #104200,R0      ;PUT VIRTUAL ADDRESS IN R0
3880  025702  012701  125206                  MOV     #125206,R1      ;PUT DATA PATTERN IN R1
```

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3881  025706  052737  000400  177572  13$:    BIS     #BIT8,@#MMR0    ;TURN ON DESTINATION ONLY RELOCATION
3882  025714  010110                          MOV     R1,(R0)         ;TRY TO LOAD DATA PATTERN INTO 62000
3883  025716  013702  062000                  MOV     @#62000,R2      ;READ (62000) INTO R2
3884  025722  000005                          RESET                   ;CLEAR MMR0
3885  025724  020102                          CMP     R1,R2           ;SEE IF DATA MATCHES PATTERN
3886  025726  001401                          BEQ     14$             ;BRANCH IF DATA MATCHES
3887  025730  104031                          ERROR   31              ;RELOCATION FAILED
3888  025732  013737  001176  062000  14$:    MOV     $TMP0,@#62000   ;RESTORE ORIGINAL DATA TO TEST LOCATION
3889  025740  012737  026006  001110          MOV     #15$,$LPERR     ;SET LOOP ON ERROR POINTER TO 15$
3890  025746  013737  062000  001176          MOV     @#62000,$TMP0   ;SAVE DATA AT TEST LOCATION
3891  025754  012737  000442  172350          MOV     #442,@#KIPAR4   ;LOAD PAR4 WITH 442
3892  025762  012737  000442  001200          MOV     #442,$TMP1      ;SAVE 442 FOR ERROR REPORT
3893  025770  012737  062000  001202          MOV     #62000,$TMP2    ;SAVE 62000 FOR ERROR REPORT
3894  025776  012700  115600                  MOV     #115600,R0      ;PUT VIRTUAL ADDRESS IN R0
3895  026002  012701  125207                  MOV     #125207,R1      ;PUT DATA PATTERN IN R1
3896  026006  052737  000400  177572  15$:    BIS     #BIT8,@#MMR0    ;TURN ON DESTINATION ONLY RELOCATION
3897  026014  010110                          MOV     R1,(R0)         ;TRY TO LOAD DATA PATTERN INTO 62000
3898  026016  013702  062000                  MOV     @#62000,R2      ;READ (62000) INTO R2
3899  026022  000005                          RESET                   ;CLEAR MMR0
3900  026024  020102                          CMP     R1,R2           ;SEE IF DATA MATCHES PATTERN
3901  026026  001401                          BEQ     16$             ;BRANCH IF DATA MATCHES
3902  026030  104031                          ERROR   31              ;RELOCATION FAILED
3903  026032  013737  001176  062000  16$:    MOV     $TMP0,@#62000   ;RESTORE ORIGINAL DATA TO TEST LOCATION
3904  026040  012737  026106  001110          MOV     #17$,$LPERR     ;SET LOOP ON ERROR POINTER TO 17$
3905  026046  013737  062000  001176          MOV     @#62000,$TMP0   ;SAVE DATA AT TEST LOCATION
3906  026054  012737  000577  172350          MOV     #577,@#KIPAR4   ;LOAD PAR4 WITH 577
3907  026062  012737  000577  001200          MOV     #577,$TMP1      ;SAVE 577 FOR ERROR REPORT
3908  026070  012737  062000  001202          MOV     #62000,$TMP2    ;SAVE 62000 FOR ERROR REPORT
3909  026076  012700  102100                  MOV     #102100,R0      ;PUT VIRTUAL ADDRESS IN R0
3910  026102  012701  125210                  MOV     #125210,R1      ;PUT DATA PATTERN IN R1
3911  026106  052737  000400  177572  17$:    BIS     #BIT8,@#MMR0    ;TURN ON DESTINATION ONLY RELOCATION
3912  026114  010110                          MOV     R1,(R0)         ;TRY TO LOAD DATA PATTERN INTO 62000
3913  026116  013702  062000                  MOV     @#62000,R2      ;READ (62000) INTO R2
3914  026122  000005                          RESET                   ;CLEAR MMR0
3915  026124  020102                          CMP     R1,R2           ;SEE IF DATA MATCHES PATTERN
3916  026126  001401                          BEQ     18$             ;BRANCH IF DATA MATCHES
3917  026130  104031                          ERROR   31              ;RELOCATION FAILED
3918  026132  013737  001176  062000  18$:    MOV     $TMP0,@#62000   ;RESTORE ORIGINAL DATA TO TEST LOCATION
3919  026140  012737  026206  001110          MOV     #21$,$LPERR     ;SET LOOP ON ERROR POINTER TO 21$
3920  026146  013737  062000  001176          MOV     @#62000,$TMP0   ;SAVE DATA AT TEST LOCATION
3921  026154  012737  000421  172350          MOV     #421,@#KIPAR4   ;LOAD PAR4 WITH 421
3922  026162  012737  000421  001200          MOV     #421,$TMP1      ;SAVE 421 FOR ERROR REPORT
3923  026170  012737  062000  001202          MOV     #62000,$TMP2    ;SAVE 62000 FOR ERROR REPORT
3924  026176  012700  117700                  MOV     #117700,R0      ;PUT VIRTUAL ADDRESS IN R0
3925  026202  012701  125211                  MOV     #125211,R1      ;PUT DATA PATTERN IN R1
3926  026206  052737  000400  177572  21$:    BIS     #BIT8,@#MMR0    ;TURN ON DESTINATION ONLY RELOCATION
3927  026214  010110                          MOV     R1,(R0)         ;TRY TO LOAD DATA PATTERN INTO 62000
3928  026216  013702  062000                  MOV     @#62000,R2      ;READ (62000) INTO R2
3929  026222  000005                          RESET                   ;CLEAR MMR0
3930  026224  020102                          CMP     R1,R2           ;SEE IF DATA MATCHES PATTERN
3931  026226  001401                          BEQ     22$             ;BRANCH IF DATA MATCHES
3932  026230  104031                          ERROR   31              ;RELOCATION FAILED
3933  026232  013737  001176  062000  22$:    MOV     $TMP0,@#62000   ;RESTORE ORIGINAL DATA TO TEST LOCATION
3934  026240  012737  026306  001110          MOV     #23$,$LPERR     ;SET LOOP ON ERROR POINTER TO 23$
3935  026246  013737  060000  001176          MOV     @#60000,$TMP0   ;SAVE DATA AT TEST LOCATION
3936  026254  012737  000577  172350          MOV     #577,@#KIPAR4   ;LOAD PAR4 WITH 577
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3937  026262  012737  000577  001200          MOV     #577,$TMP1      ;SAVE 577 FOR ERROR REPORT
3938  026270  012737  060000  001202          MOV     #60000,$TMP2    ;SAVE 60000 FOR ERROR REPORT
3939  026276  012700  100100                  MOV     #100100,R0      ;PUT VIRTUAL ADDRESS IN R0
3940  026302  012701  125212                  MOV     #125212,R1      ;PUT DATA PATTERN IN R1
3941  026306  052737  000400  177572  23$:    BIS     #BIT8,@#MMR0    ;TURN ON DESTINATION ONLY RELOCATION
3942  026314  010110                          MOV     R1,(R0)         ;TRY TO LOAD DATA PATTERN INTO 60000
3943  026316  013702  060000                  MOV     @#60000,R2      ;READ (60000) INTO R2
3944  026322  000005                          RESET                   ;CLEAR MMR0
3945  026324  020102                          CMP     R1,R2           ;SEE IF DATA MATCHES PATTERN
3946  026326  001401                          BEQ     24$             ;BRANCH IF DATA MATCHES
3947  026330  104031                          ERROR   31              ;RELOCATION FAILED
3948  026332  013737  001176  060000  24$:    MOV     $TMP0,@#60000   ;RESTORE ORIGINAL DATA TO TEST LOCATION
3949  026340  012737  026406  001110          MOV     #25$,$LPERR     ;SET LOOP ON ERROR POINTER TO 25$
3950  026346  013737  060000  001176          MOV     @#60000,$TMP0   ;SAVE DATA AT TEST LOCATION
3951  026354  012737  000570  172350          MOV     #570,@#KIPAR4   ;LOAD PAR4 WITH 570
3952  026362  012737  000570  001200          MOV     #570,$TMP1      ;SAVE 570 FOR ERROR REPORT
3953  026370  012737  060000  001202          MOV     #60000,$TMP2    ;SAVE 60000 FOR ERROR REPORT
3954  026376  012700  101000                  MOV     #101000,R0      ;PUT VIRTUAL ADDRESS IN R0
3955  026402  012701  125213                  MOV     #125213,R1      ;PUT DATA PATTERN IN R1
3956  026406  052737  000400  177572  25$:    BIS     #BIT8,@#MMR0    ;TURN ON DESTINATION ONLY RELOCATION
3957  026414  010110                          MOV     R1,(R0)         ;TRY TO LOAD DATA PATTERN INTO 60000
3958  026416  013702  060000                  MOV     @#60000,R2      ;READ (60000) INTO R2
3959  026422  000005                          RESET                   ;CLEAR MMR0
3960  026424  020102                          CMP     R1,R2           ;SEE IF DATA MATCHES PATTERN
3961  026426  001401                          BEQ     26$             ;BRANCH IF DATA MATCHES
3962  026430  104031                          ERROR   31              ;RELOCATION FAILED
3963  026432  013737  001176  060000  26$:    MOV     $TMP0,@#60000   ;RESTORE ORIGINAL DATA TO TEST LOCATION
3964                                  ;*
3965                                  ;*      THE FOLLOWING CODE PERFORMS A COUPLE RELOCATION ADDER CHECKS
3966                                  ;*      USING THE PROCESSOR STATUS WORD AS THE PHYSICAL ADDRESS
3967                                  ;*      WHICH IS GENERATED TO CHECK THE UPPER BITS OF THE "PHYSICAL
3968                                  ;*      BUS ADDRESS ALU".  SPECIAL DATA PATTERNS ARE USED DUE TO
3969                                  ;*      THE CONDITION CODE BITS.
3970
3971  026440  012737  026500  001110          MOV     #27$,$LPERR     ;SET LOOP ON ERROR POINTER TO 27$
3972  026446  012737  007600  172350          MOV     #7600,KIPAR4    ;LOAD PAR4 WITH 7600
3973  026454  012737  007600  001200          MOV     #7600,$TMP1     ;SAVE PAR4 DATA FOR ERROR REPORT
3974  026462  012737  177776  001202          MOV     #177776,$TMP2   ;SAVE PHYS. ADDR. FOR ERROR REPORT
3975  026470  012700  117776                  MOV     #117776,R0      ;PUT VIRTUAL ADDR. IN R0
3976  026474  012701  000100                  MOV     #100,R1         ;PUT DATA PATTERN IN R1
3977  026500  052737  000400  177572  27$:    BIS     #BIT8,@#MMR0    ;TURN ON DEST.-ONLY-RELOCATION
3978  026506  010110                          MOV     R1,(R0)         ;LOAD DATA INTO PSW USING PAR4
3979  026510  013702  177776                  MOV     @#177776,R2     ;READ PSW INTO R2
3980  026514  000005                          RESET                   ;CLEAR MMR0
3981  026516  042702  000020                  BIC     #20,R2          ;CLEAR T-BIT IF SET IN DATA READ
3982  026522  020102                          CMP     R1,R2           ;SEE IF DATA MATCHES PATTERN WRITTEN
3983  026524  001401                          BEQ     28$             ;BRANCH IF DATA MATCHES
3984  026526  104031                          ERROR   31              ;RELOCATION FAILED
3985  026530  012737  026570  001110  28$:    MOV     #29$,$LPERR     ;SET LOOP ON ERROR POINTER TO 29$
3986  026536  012737  007777  172350          MOV     #7777,KIPAR4    ;LOAD PAR4 WITH 7777
3987  026544  012737  007777  001200          MOV     #7777,$TMP1     ;SAVE PAR4 DATA FOR ERROR REPORT
3988  026552  012737  177776  001202          MOV     #177776,$TMP2   ;SAVE PHYS. ADDR. FOR ERROR REPORT
3989  026560  012700  100076                  MOV     #100076,R0      ;PUT VIRTUAL ADDR. R0
3990  026564  012701  000200                  MOV     #200,R1         ;PUT DATA PATTERN IN R1
3991  026570  052737  000400  177572  29$:    BIS     #BIT8,@#MMR0    ;TURN ON DEST.-ONLY-RELOCATION
3992  026576  010110                          MOV     R1,(R0)         ;LOAD DATA INTO PSW USING PAR4
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3993  026600  013702  177776          MOV     @#177776,R2     ;READ PSW INTO R2
3994  026604  000005                  RESET                   ;CLEAR MMR0
3995  026606  042702  000020          BIC     #20,R2          ;CLEAR T-BIT IF SET IN DATA READ
3996  026612  020102                  CMP     R1,R2           ;SEE IF DATA MATCHES PATTERN
3997  026614  001401                  BEQ     30$             ;BRANCH IF DATA MATCHES
3998  026616  104031                  ERROR   31              ;RELOCATION FAILED
3999  026620                  30$:
4000  026620  005037  177776          CLR     @#PSW           ;CLEAR PSW BEFORE LEAVING TEST
4001  026624  012737  025162  001110  MOV     #20$,$LPERR     ;SET LOOP ON ERROR POINTER TO START OF TEST
4002
4003                          ;;*****************************************************************
4004                          ;*TEST 32       18-BIT MAPPING CARRY PROPAGATION
4005                          ;*
4006                          ;*      THIS TEST USES FULL 18-BIT RELOCATION TO CHECK THE CARRY
4007                          ;*      PROPAGATION OF THE RELOCATION ADDER.  SINCE THIS TEST SCANS
4008                          ;*      MEMORY FROM 060000 TO 750000 ON 2K BOUNDARIES, IT WILL
4009                          ;*      REPORT ANY HOLES THAT IT FINDS IN MEMORY UP TO THE 124K
4010                          ;*      THE INFORMATION GIVEN WILL BE THE ADDRESS WHERE
4011                          ;*      THE HOLE WAS DISCOVERED AND THE FIRST GOOD ADDRESS AFTER THE
4012                          ;*      HOLE.
4013                          ;;*****************************************************************
4014  026632                  TST32:
4015  026632  000004                  SCOPE
4016  026634  012737  027200  001444  MOV     #TST33,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
4017                                                          ;TEST FOR ESCAPE ON PARITY ERRORS
4018  026642  005037  001432  20$:    CLR     HOLFLG          ;MAKE SURE HOLE FLAG STARTS AT 0
4019  026646  005037  001200          CLR     $TMP1           ;CLEAR SPOT TO SAVE HOLE ADDRESS
4020  026652  012737  027170  000004  MOV     #11$,ERRVEC     ;SET ERROR POINTER TO 11$ FOR 11/6X
4021  026660  105737  001446          TSTB    FORTY           ;EXECUTING ON AN 11/40
4022  026664  001403                  BEQ     7$              ;BRANCH IF NO
4023  026666  012737  027160  000004  MOV     #10$,ERRVEC     ;SET ERROR POINTER TO 10$ FOR 11/40
4024  026674                  7$:
4025  026674  012737  000577  172350  MOV     #577,KIPAR4     ;LOAD PAR4 WITH STARTING BASE
4026  026702  012737  000600  172352  MOV     #600,KIPAR5     ;START ADDRESSING WITH 12K
4027  026710  012700  100100          MOV     #100100,R0      ;LOAD VIRTUAL ADDR FOR PAR4 IN R0
4028  026714  012701  120000          MOV     #120000,R1      ;LOAD VIRTUAL ADDR FOR PAR5 IN R1
4029  026720  012702  001000          MOV     #1000,R2        ;LOAD DATA PATTERN INTO R2
4030  026724  012737  000001  177572  MOV     #1,@#MMR0       ;TURN ON 18-BIT MAPPING
4031                                  ;
4032                                  ;FULL RELOCATION STARTS HERE AND CONTINUES FOR REST OF PROGRAM
4033                                  ;
4034  026732  012737  027030  001110  1$:     MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
4035  026740  005037  001406          CLR     PCPUER          ;CLEAR CPU ERROR FLAG
4036  026744  011137  001176          MOV     (R1),$TMP0      ;SAVE DATA AT TEST LOCATION
4037  026750  032737  000020  001406  BIT     #BIT4,PCPUER    ;SEE IF THERE WAS A CPU TRAP
4038  026756  001411                  BEQ     2$              ;BRANCH IF NO TIMEOUT
4039  026760  005237  001432          INC     HOLFLG          ;SET FLAG IF THERE WAS TIMEOUT
4040  026764  005737  001200          TST     $TMP1           ;HAVE I SAVED STARTING ADDR. OF HOLE
4041  026770  001034                  BNE     5$              ;  IF I HAVE I'LL CONTINUE
4042  026772  013737  172352  001200  MOV     KIPAR5,$TMP1    ;SAVE PAR-POSSIBLE START OF HOLE
4043  027000  000430                  BR      5$              ;BRANCH TO CHANGE BASE ADDRESS
4044  027002  005737  001432  2$:     TST     HOLFLG          ;IF HOLFLG CLEAR-NO TIMEOUTS YET
4045  027006  001410                  BEQ     3$              ;OTHERWISE HAVE FOUND MEMORY HOLE
4046  027010  013737  172352  001202  MOV     KIPAR5,$TMP2    ;SAVE PAR THAT POINTS TO END OF HOLE
4047  027016  104032                  ERROR   32              ;HOLE IN MEMORY FROM $TMP1 TO $TMP2
4048  027020  005037  001432          CLR     HOLFLG          ;CLEAR HOLE FLAG IN CASE THERES MORE
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4049  027024  005037  001200            CLR     $TMP1           ;CLEAR STARTING ADDR. LOC. ALSO
4050  027030  010210            3$:     MOV     R2,(R0)         ;LOAD TEST PATTERN INTO TEST LOCATION
4051  027032  011103                    MOV     (R1),R3         ;READ TEST LOCATION VIA DIFFERENT PAR
4052  027034  020203                    CMP     R2,R3           ;SEE IF CORRECT LOCATION REFERENCED
4053  027036  001407                    BEQ     4$              ;BRANCH IF CORRECT DATA OBTAINED
4054  027040  013737  172350  001204    MOV     KIPAR4,$TMP3    ;SAVE PAR4 FOR ERROR REPORT
4055  027046  013737  172352  001206    MOV     KIPAR5,$TMP4    ;SAVE PAR5 FOR ERROR REPORT
4056  027054  104033                    ERROR   33              ;OTHERWISE BAD RELOCATION
4057  027056  013711  001176      4$:   MOV     $TMP0,(R1)      ;RESTORE ORIGINAL DATA TO TEST LOCATION
4058  027062  062737  000100  172350  5$:   ADD     #100,KIPAR4     ;CHANGE BASE ADDRESS
4059  027070  062737  000100  172352        ADD     #100,KIPAR5     ;CHANGE BASE ADDRESS
4060  027076  005202                    INC     R2              ;CHANGE DATA PATTERN
4061  027100  022737  007500  172352    CMP     #7500,KIPAR5    ;SEE IF PAST 122K-LAST ADDRESS
4062  027106  103311                    BHIS    1$              ;BRANCH IF NOT PAST LAST ADDRESS
4063                              ;*
4064                              ;*      ADDRESS 000000 IS GENERATED BY CARRY PROPAGATION, USING
4065                              ;*      '7777' IN KIPAR4 WITH A VIRTUAL ADDRESS OF '100100'.
4066                              ;*
4067                              ;*
4068                              ;*
4069                              ;*
4070                              ;*
4071
4072  027110  012737  027130  001110  6$:   MOV     #16$,$LPERR     ;SET LOOP ON ERROR POINTER TO 16$
4073  027116  012737  007777  172350        MOV     #7777,KIPAR4    ;LOAD PAR 4 WITH HIGHEST VALUE POSSIBLE
4074  027124  005037  000000              CLR     @#000000        ;CLEAR ADDRESS ZERO
4075  027130  013701  100100      16$:    MOV     @#100100,R1     ;THIS SHOULD READ ADDRESS ZERO INTO R1
4076  027134  005701                    TST     R1              ;SEE IF YOU REALLY READ ADDRESS ZERO
4077  027136  001401                    BEQ     8$              ;BRANCH IF YOU READ ADDRESS ZERO
4078  027140  104034                    ERROR   34              ;DIDN'T READ ADDRESS ZERO
4079  027142  012737  015160  000004  8$:   MOV     #CPUER,ERRVEC   ;RESTORE NORMAL CPU TRAP ROUTINE
4080  027150  012737  026642  001110        MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
4081  027156  000410                    BR      TST33           ;;BRANCH TO NEXT TEST
4082
4083                              ;;********************  TRAP TO HERE THRU ERRVEC  **********************
4084
4085  027160  012737  000020  001406  10$:   MOV     #BIT4,PCPUER    ;SET "TRAP-TO-4" FLAG
4086  027166  000002                    RTI
4087  027170  013737  177766  001406  11$:   MOV     @#CPUERR,PCPUER ;SAVE CPU ERROR REGISTER
4088  027176  000002                    RTI                     ;RETURN TO TEST AND CONTINUE
4089
4090
4091
4092
4093
4094
4095                              .SBTTL  ************ ENTRY POINT 5 --- STARTING ADDRESS 220 ************
4096                              .SBTTL  ******** MEMORY MANAGEMENT ABORTS LOGIC TESTS ********
4097                              ;*
4098                              ;*      THIS GROUP OF TESTS CHECKS OUT THE MEMORY MANAGEMENT ABORT LOGIC, AND
4099                              ;*      ALSO CHECK OUT BITS <06:05> AND <03:00> OF MMR0, AND ALL BITS OF MMR2.
4100
4101
4102                              ;;*****************************************************************
4103                              ;*TEST 33       PAGE LENGTH FAULTS - UPWARD EXPANSION
4104                              ;*
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                                        ;*      THIS TEST CHECKS OUT THE PAGE LENGTH COMPARATORS
                                        ;*      AND THE LOGIC THAT GENERATES "PAGE LTH ERR".  IT TRIES
                                        ;*      EVERY PAGE LENGTH FIELD FROM 1 BLOCK TO 200(8) BLOCKS.  THE
                                        ;*      TEST THEN TRIES A REFERENCE AT EVERY 100 BYTES UNTIL AN ABORT
                                        ;*      OCCURS.  IF THE ABORT HAPPENS TOO SOON OR IF NO ABORT HAPPENS AT
                                        ;*      THE CORRECT BLOCK NUMBER AN ERROR IS REPORTED.
                                        ;*
                                        ;;*****************************************************************
027200                                  TST33:
027200  000004                                  SCOPE
027202  012737  027524  001444                  MOV     #TST34,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
                                                                        ;TEST FOR ESCAPE ON PARITY ERRORS
027210  012737  000024  001212                  MOV     #24,$TIMES      ;;DO 24 ITERATIONS
027216                                  ENTPTS:
027216  012737  027342  001110                  MOV     #20$,$LPERR     ;SET LOOP ON ERROR POINTER TO 20$
027224  012737  000033  001102                  MOV     #33,$TSTNM      ;LOAD TEST NUMBER INTO MEMORY
027232  013777  001102  151702                  MOV     $TSTNM,@DISPLAY ;DISPLAY TEST NUMBER FOR THIS TEST
027240  012737  077406  172300                  MOV     #77406,KIPDR0   ;MAKE KERNEL I PAGE 0 200 BLOCKS, R/W
027246  012737  077406  172302                  MOV     #77406,KIPDR1   ;MAKE KERNEL I PAGE 1 200 BLOCKS, R/W
027254  012737  077406  172304                  MOV     #77406,KIPDR2   ;MAKE KERNEL I PAGE 2 200 BLOCKS, R/W
027262  012737  077406  172306                  MOV     #77406,KIPDR3   ;MAKE KERNEL I PAGE 3 200 BLOCKS, R/W
027270  012737  077406  172316                  MOV     #77406,KIPDR7   ;MAKE KERNEL I PAGE 7 200 BLOCKS, R/W
027276  012737  000000  172340                  MOV     #000,KIPAR0     ;MAP KERNEL I PAGE 0 TO 0 - 4K
027304  012737  000200  172342                  MOV     #200,KIPAR1     ;MAP KERNEL I PAGE 1 TO 4K - 8K
027312  012737  000400  172344                  MOV     #400,KIPAR2     ;MAP KERNEL I PAGE 2 TO 8K - 12K
027320  012737  000600  172346                  MOV     #600,KIPAR3     ;MAP KERNEL I PAGE 3 TO 12K - 16K
027326  012737  007600  172356                  MOV     #7600,KIPAR7    ;MAP KERNEL I PAGE 7 TO THE I/O PAGE
027334  012737  000001  177572                  MOV     #BIT0,MMR0      ;ENABLE 18-BIT RELOCATION IF NOT ON
027342  012737  000006  172310  20$:            MOV     #000006,@#KIPDR4 ;LOAD PDR4 FOR PAGE LENGTH OF 1
027350  012737  000600  172350                  MOV     #600,KIPAR4     ;MAP PAGE 4 TO 12K
027356  012700  172311                          MOV     #KIPDR4+1,R0    ;PUT ADDRESS OF PDR 4'S UPPER BYTE IN R0
027362  012737  027424  001110                  MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
027370  005037  001402          1$:             CLR     PMMR0           ;CLEAR LOCATION THAT HOLDS MMR0
027374  012702  100000                          MOV     #100000,R2      ;PUT VIRTUAL ADDRESS INTO R2
027400  010203                  2$:             MOV     R2,R3           ;PUT VIRTUAL ADDRESS INTO R3 TOO
027402  006203                                  ASR     R3              ;RIGHT SHIFT 6 BITS SO IT WILL
027404  006203                                  ASR     R3              ;MATCH THE PLF
027406  006203                                  ASR     R3
027410  006203                                  ASR     R3
027412  006203                                  ASR     R3
027414  006203                                  ASR     R3
027416  042703  177600                          BIC     #177600,R3      ;CLEAR BITS THAT ARE SET IN UPPER BYTE
027422  111001                                  MOVB    (R0),R1         ;SAVE PLF IN R1 FOR LATER COMPARISON
027424  012737  040011  001364  3$:             MOV     #040011,MMEXP   ;POTENTIAL ABORT CONDITION: PAGE LENGTH
                                                                        ;ERROR KERNEL, I-SPACE, PAGE 4
027432  011204                                  MOV     (R2),R4         ;READ USING V.A. IN R2
027434  005037  001364                          CLR     MMEXP           ;CLEAR EXPECTED ABORT CONDITION
027440  005737  001402                          TST     PMMR0           ;SEE IF ABORT OCCURRED YET
027444  001405                                  BEQ     4$              ;BRANCH IF NO ABORT YET, CHANGE V.A.
027446  005303                                  DEC     R3              ;MAKE R3 EQUAL TO PLF
027450  020103                                  CMP     R1,R3           ;SEE IF PDR 4'S PLF=R3
027452  001414                                  BEQ     6$              ;BRANCH IF ABORT HAPPENS AT RIGHT PLACE
027454  104035                                  ERROR   35              ;ABORT WRONG PLACE
027456  000412                                  BR      6$              ;BRANCH TO CHANGE PLF
027460  020103                  4$:             CMP     R1,R3           ;SEE IF PAGE LENGTH FAULT SHOULD HAVE OCCURRED
027462  103002                                  BHIS    5$              ;BRANCH IF NO PAGE LENGTH FAULT CONDITION
```

```
                                        ERROR   36              ;NO ABORT, IT SHOULD HAVE HAPPENED THIS TIME
                                        BR      6$              ;BRANCH TO CHANGE PLF
                                5$:     CMPB    R3,#177         ;SEE IF V.A. IS 177
                                        BEQ     6$              ;BRANCH TO CHECK PLF
                                        ADD     #100,R2         ;CHANGE VIRTUAL ADDRESS
                                        BR      2$              ;GO TRY THE NEXT VIRTUAL ADDRESS
                                6$:     CMPB    #177,(R0)       ;SEE IF PDR 4'S PLF IS 177
                                        BEQ     7$              ;BRANCH TO EXIT IF PLF IS 177
                                        INCB    (R0)            ;STEP PLF OF PDR 4 UP BY 1
                                        BR      1$              ;BRANCH TO START WITH V.A. OF 0
                                7$:     MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST

                                ;*****************************************************************
                                ;*TEST 34       PAGE LENGTH FAULTS - DOWNWARD EXPANSION
                                ;*
                                ;*      THIS TEST CHECKS OUT THE PAGE LENGTH COMPARATORS
                                ;*      AND THE LOGIC THAT GENERATES "PAGE LTH ERR".  IT TRIES
                                ;*      EVERY PAGE LENGTH FIELD FROM 1 BLOCK TO 200(8) BLOCKS.  THE
                                ;*      TEST THEN TRIES A REFERENCE AT EVERY 100 BYTES UNTIL AN ABORT
                                ;*      OCCURS.  IF THE ABORT HAPPENS TOO SOON OR IF NO ABORT HAPPENS A
                                ;*      THE CORRECT BLOCK NUMBER AN ERROR IS REPORTED.
                                ;*
                                ;*****************************************************************
                                TST34:
                                        SCOPE
                                        MOV     #TST35,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
                                                                ;TEST FOR ESCAPE ON PARITY ERRORS
                                        MOV     #24,$TIMES      ;;DO 24 ITERATIONS
                                20$:    MOV     #77416,@#KIPDR4 ;LOAD PDR4 FOR PAGE LENGTH OF 1
                                        MOV     #600,KIPAR4     ;MAP PAGE 4 TO 12K
                                        MOV     #KIPDR4+1,R0    ;PUT ADDRESS OF PDR 4'S UPPER BYTE IN R0
                                        MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
                                1$:     CLR     PMMR0           ;CLEAR LOCATION THAT HOLDS MMR0
                                        MOV     #117700,R2      ;PUT VIRTUAL ADDRESS INTO R2
                                2$:     MOV     R2,R3           ;PUT VIRTUAL ADDRESS INTO R3 TOO
                                        ASR     R3              ;RIGHT SHIFT 6 BITS SO IT WILL
                                        ASR     R3              ;MATCH THE PLF
                                        ASR     R3
                                        ASR     R3
                                        ASR     R3
                                        ASR     R3
                                        BIC     #177600,R3      ;CLEAR BITS THAT ARE SET IN UPPER BYTE
                                        MOVB    (R0),R1         ;SAVE PLF IN R1 FOR LATER COMPARISON
                                3$:     MOV     #040011,MMEXP   ;POTENTIAL ABORT CONDITION: PAGE LENGTH
                                                                ;ERROR KERNEL, I-SPACE, PAGE 4
                                        MOV     (R2),R4         ;READ USING V.A. IN R2
                                        CLR     MMEXP           ;CLEAR EXPECTED ABORT CONDITION
                                        TST     PMMR0           ;SEE IF ABORT OCCURRED YET
                                        BEQ     4$              ;BRANCH IF NO ABORT YET, CHANGE V.A.
                                        INC     R3              ;MAKE R3 EQUAL TO PLF
                                        CMP     R1,R3           ;SEE IF PDR 4'S PLF=R3
                                        BEQ     6$              ;BRANCH IF ABORT HAPPENS AT RIGHT PLACE
                                        ERROR   35              ;ABORT WRONG PLACE
                                        BR      6$              ;BRANCH TO CHANGE PLF
                                4$:     CMP     R1,R3           ;SEE IF PAGE LENGTH FAULT SHOULD HAVE OCCURRED
                                        BLOS    5$              ;BRANCH IF NO PAGE LENGTH FAULT CONDITION
```

```
4217  027664  104036                          ERROR   36              ;NO ABORT, IT SHOULD HAVE HAPPENED  HIS TIME
4218  027666  000406                          BR      6$              ;BRANCH TO CHANGE PLF
4219  027670  120327  000000          5$:     CMPB    R3,#000         ;SEE IF V.A. IS 000
4220  027674  001403                          BEQ     6$              ;BRANCH TO CHECK PLF
4221  027676  162702  000100                  SUB     #100,R2         ;CHANGE VIRTUAL ADDRESS
4222  027702  000736                          BR      2$              ;GO TRY THE NEXT VIRTUAL ADDRESS
4223  027704  122710  000000          6$:     CMPB    #000,(R0)       ;SEE IF PDR 4'S PLF IS 000
4224  027710  001402                          BEQ     7$              ;BRANCH TO EXIT IF PLF IS 000
4225  027712  105310                          DECB    (R0)            ;STEP PLF OF PDR 4 UP BY 1
4226  027714  000725                          BR      1$              ;BRANCH TO START WITH V.A. OF 0
4227  027716  012737  027542  001110  7$:     MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TES
4228
4229
4230                                          ;*****************************************************************
4231                                          ;*TEST 35       ACCESS CONTROL FIELD = 0, OR 4 (ABORT ALL ACCESSES)
4232                                          ;*
4233                                          ;*      THESE A.C.F.'S ARE ALL NON-RESIDENT, ANY REFERENCE (READ
4234                                          ;*      OR WRITE) TO A NON-RESIDENT PAGE SHOULD SET BIT 15 IN MMR0.
4235                                          ;*      BITS <06:05> AND <03:00> IN MMR0 WILL LOCK UP ALL AVAILABLE INFORMATION
4236                                          ;*      ON THAT PAGE.  IN THIS CASE THE PAGE THAT CAUSES THE ABORT
4237                                          ;*      IS KERNEL PAGE 5.  THE EXPECTED ERROR CODE IS 100013.
4238                                          ;*
4239                                          ;*****************************************************************
4240  027724                          TST35:
4241  027724  000004                          SCOPE
4242  027726  012737  030222  001444          MOV     #TST36,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
4243                                                                  ;TEST FOR ESCAPE ON PARITY ERRORS
4244  027734  012737  077406  172310  20$:     MOV     #77406,@#KIPDR4 ;LOAD ACF 6 INTO PDR 4
4245  027742  012737  077400  172312          MOV     #77400,@#KIPDR5 ;LOAD ACF 0 INTO PDR5
4246
4247  027750  012737  000600  172350          MOV     #600,@#KIPAR4   ;LOAD 12K INTO PAR4
4248  027756  012737  000600  172352          MOV     #600,@#KIPAR5   ;LOAD 12K INTO PAR5
4249  027764  012700  100000                  MOV     #100000,R0      ;LOAD VIRTUAL ADDRESS FOR PAR4 INTO R0
4250  027770  012701  120000                  MOV     #120000,R1      ;LOAD VIRTUAL ADDRESS FOR PAR5 INTO R1
4251  027774  012702  161457                  MOV     #161457,R2      ;LOAD DATA PATTERN INTO R2
4252  030000  012737  030010  001110  11$:     MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
4253  030006  005010                          CLR     (R0)            ;CLEAR MEMORY LOCATION 60000
4254  030010  012737  100013  001364  1$:     MOV     #100013,MMEXP   ;LOAD EXPECTED ABORT CONDITION: NON-RESIDENT,
4255                                                                  ;KERNEL, PAGE 5, FULL RELOCATION
4256  030016  010211                  8$:     MOV     R2,(R1)         ;WRITE TO NON-RESIDENT OR UNUSED ACF
4257                                                                  ;SHOULD CAUSE ABORT
4258  030020  005037  001364                  CLR     MMEXP           ;CLEAR EXPECTED ABORT CONDITION
4259
4260  030024  005710                          TST     (R0)            ;SEE IF (60000) IS STILL ZERO
4261  030026  001411                          BEQ     2$              ;BRANCH IF (60000) IS ZERO
4262  030030  013737  172312  001176          MOV     KIPDR5,$TMP0    ;SAVE KIPDR5 FOR ERROR REPORT
4263  030036  013737  172352  001200          MOV     KIPAR5,$TMP1    ;SAVE KIPAR5 FOR ERROR REPORT
4264  030044  010137  001202                  MOV     R1,$TMP2        ;SAVE VIRT ADR. FOR ERROR REPORT
4265  030050  104037                          ERROR   37              ;ABORT DID NOT HAPPEN
4266  030052  012737  030064  001110  2$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
4267  030060  010210                          MOV     R2,(R0)         ;LOAD DATA PATTERN INTO 60000
4268  030062  005004                          CLR     R4              ;CLEAR REGISTER TO RECEIVE DATA
4269  030064  012737  100013  001364  4$:     MOV     #100013,MMEXP   ;LOAD EXPECTED ABORT CONDITION: NON-RESIDENT,
4270                                                                  ;KERNEL, I-SPACE, PAGE 5, FULL RELOCATION
4271  030072  011104                  9$:     MOV     (R1),R4         ;TRY TO READ (100000) INTO R4
4272                                                                  ;THIS SHOULD ABORT
```

```
4273  030074  005037  001364                CLR     MMEXP           ;EXPECTED ABORT CONDITION
4274
4275  030100  005704                        TST     R4              ;MAKE SURE R4 IS STILL 0
4276  030102  001411                        BEQ     5$              ;BRANCH IF R4 IS 0
4277  030104  013737  172312  001176        MOV     KIPDR5,$TMP0    ;SAVE KIPDR5 FOR ERROR REPORT
4278  030112  013737  172352  001200        MOV     KIPAR5,$TMP1    ;SAVE KIPAR5 FOR ERROR REPORT
4279  030120  010137  001202                MOV     R1,$TMP2        ;SAVE VIRT ADR. FOR ERROR REPORT
4280  030124  104037                        ERROR   37              ;ABORT DID NOT HAPPEN
4281  030126                        5$:
4282  030126  023727  172312  077404        CMP     KIPDR5,#77404   ;SEE IF PDR 5'S ACF=4
4283  030134  001404                        BEQ     12$             ;TEST OVER IF ACF=4
4284  030136  012737  077404  172312  10$:  MOV     #77404,KIPDR5   ;MAKE PDR 5'S ACF=4
4285  030144  000715                        BR      11$             ;REPEAT TEST WITH ACF=4
4286                                        ;;
4287                                        ;;      THIS SECTION OF CODE VERIFIES THAT YOU WON'T MODIFY A MEMORY
4288                                        ;;      MANAGEMENT REGISTER ON A M.M. ABORT REFERENCE.
4289                                        ;;
4290  030146  012737  030174  001110  12$:  MOV     #13$,$LPERR     ;SET LOOP ON ERROR POINTER TO 13$
4291  030154  012737  007600  172352        MOV     #7600,KIPAR5    ;MAP PAGE 5 TO I/O PAGE
4292  030162  012701  132350                MOV     #132350,R1      ;LOAD VIRTUAL ADDRESS TO REFERENCE
4293                                                                ;KIPAR4
4294  030166  012737  100013  001364        MOV     #100013,MMEXP   ;EXPECTING NON-RESIDENT ABORT
4295                                                                ;KERNEL I PAGE 5
4296  030174  005011                13$:    CLR     (R1)            ;THIS INSTRUCTION SHOULD ABORT
4297                                                                ;DURING THE ABORT 'NON RES ERR' IS
4298                                                                ;ASSERTED TO STOP THE CLOCKING OF THE
4299                                                                ;FLIP/FLOPS
4300  030176  022737  000600  172350        CMP     #600,KIPAR4     ;KIPAR4 SHOULD STILL BE 600
4301  030204  001401                        BEQ     14$             ;BRANCH IF KIPAR4 IS STILL 600
4302  030206  104074                        ERROR   74              ;ABORT DID NOT STOP CLRING OF KIPAR4
4303  030210  012737  027734  001110  14$:  MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
4304  030216  005037  001364                CLR     MMEXP           ;NOT EXPECTING ANY TRAPS
4305
4306
4307                                        ;;**************************************************************
4308                                        ;*TEST 36       ACCESS CONTROL FIELD = 2  (ABORT ON WRITE)
4309                                        ;*
4310                                        ;*      THIS IS A READ ONLY A.C.F., ANY WRITE ATTEMPT TO THIS PAGE
4311                                        ;*      WILL ABORT AND SET BIT 13 OF MMR0.
4312                                        ;*      BITS <06:05> AND <03:01> IN MMR0 WILL LOCK UP ALL AVAILABLE INFORMATION
4313                                        ;*      ON THAT PAGE.  IN THIS CASE THE WRITE ATTEMPT WILL BE TO
4314                                        ;*      KERNEL SPACE PAGE 4.  THE EXPECTED ERROR CODE IS 020011.
4315                                        ;*
4316                                        ;;**************************************************************
4317  030222                        TST36:
4318  030222  000004                        SCOPE
4319  030224  012737  030466  001444        MOV     #TST37,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
4320                                                                ;TEST FOR ESCAPE ON PARITY ERRORS
4321  030232                        20$:
4322  030232  012737  000600  172352        MOV     #600,KIPAR5     ;MAP PAGE 5 TO 12K
4323  030240  012737  000600  172350        MOV     #600,KIPAR4     ;MAP PAGE 4 TO 12K
4324  030246  012737  077406  172312        MOV     #77406,KIPDR5   ;PAGE 5 IS 200 BLOCKS LONG,
4325                                                                ;EXPANDS UPWARD, AND IS READ/WRITE
4326                                                                ;WITH NO TRAPPING
4327  030254  012737  077402  172310        MOV     #77402,KIPDR4   ;LOAD ACF 2 INTO PDR 4
4328  030262  005037  001364                CLR     MMEXP           ;NOT EXPECTING ANY TRAPS OR ABORTS YET
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```
 4329  030266  012737  002222  120000          MOV     #2222,@#120000  ;LOAD DATA INTO 12K
 4330  030274  013700  100000                  MOV     @#100000,R0     ;READ DATA THRU PAGE 4
 4331  030300  005037  120000                  CLR     @#120000        ;CLEAR TEST LOCATION THRU PAGE 5
 4332  030304  012737  020011  001364          MOV     #20011,MMEXP    ;EXPECTING READ ONLY FAULT, PAGE 4
 4333  030312  012737  017777  100000          MOV     #17777,@#100000 ;TRY TO WRITE THRU PAGE 4
 4334  030320  005037  001364                  CLR     MMEXP           ;NO MORE TRAPS EXPECTED
 4335  030324  005737  120000                  TST     @#120000        ;SEE IF TEST LOCATION IS STILL ZERO
 4336  030330  001412                          BEQ     2$              ;BRANCH IF WORD IS STILL ZERO
 4337  030332  013737  172310  001176          MOV     KIPDR4,$TMP0    ;SAVE KIPDR4 FOR ERROR REPORT
 4338  030340  013737  172350  001200          MOV     KIPAR4,$TMP1    ;SAVE KIPAR4 FOR ERROR REPORT
 4339  030346  012737  100000  001202          MOV     #100000,$TMP2   ;SAVE VIRT ADR. FOR ERROR REPORT
 4340  030354  104040                          ERROR   40              ;NO ABORT ON PAGE 4
 4341  030356  105737  001446          2$:     TSTB    FORTY           ;EXECUTING ON AN 11/40
 4342  030362  001041                          BNE     5$              ;BRANCH IF  YES
 4343  030364  076600                          MED                     ;READ THE LOG JAM REG.
 4344  030366  000100                          RLJAM
 4345  030370  030027  000020                  BIT     R0,#BIT4        ;WAS BIT 4 SET IN LOG JAM?
 4346  030374  001007                          BNE     4$              ;BRANCH IF YES
 4347  030376  012737  000020  001210          MOV     #BIT4,$TMP5     ;SAVE EXPECTED CONTENTS FOR ERROR
 4348  030404  012737  000100  001206          MOV     #RLJAM,$TMP4    ;SAVE LOG JAM ADDRESS FOR ERROR
 4349  030412  104022                          ERROR   22              ;BIT4 NOT SET IN LOG JAM
 4350                                                                  ;TO INDICATE KT ABORT
 4351  030414                          4$:
 4352  030414  012737  030426  000004          MOV     #3$,ERRVEC      ;SET TRAP TO 4 VECTOR TO 3$
 4353  030422  005737  000001                  TST     @#000001        ;CAUSE TRAP TO 4 WITH ODD ADDR. ERROR
 4354  030426  022626                  3$:     CMP     (SP)+,(SP)+     ;CLEAN UP STACK
 4355  030430  013737  177766  000004          MOV     CPUERR,ERRVEC   ;RESTORE NORMAL CPU TRAP ROUTINE
 4356                                                                  ;NOW CHECK FOR 250 AS LAST VEC. LOGGED
 4357  030436  076600                          MED                     ;READ LOG FLAG/INTRPT REG.
 4358  030440  000104                          RLFGIN
 4359  030442  030027  000250                  BIT     R0,#250         ;WAS VECTOR=250 RECORDED
 4360  030446  001007                          BNE     5$              ;BRANCH IF YES
 4361  030450  012737  000250  001210          MOV     #250,$TMP5      ;SAVE EXPECTED CONTENTS FOR ERROR
 4362  030456  012737  000104  001206          MOV     #RLFGIN,$TMP4   ;SAVE LOG FLAG INT ADDRESS FOR ERROR
 4363  030464  104022                          ERROR   22              ;VECTOR 250 WAS NOT LOGGIN IN
 4364  030466                          5$:                             ;LOG FLAG/INTERRUPT REG.
 4365
 4366
 4367                                  ;;*****************************************************************
 4368                                  ;*TEST 37       RED & YELLOW ZONE STACK VIOLATIONS
 4369                                  ;*
 4370                                  ;*      THE FOLLOWING TEST CHECKS THE 'RED ZONE' AND 'YELLOW ZONE' LOGIC
 4371                                  ;*      ON PAGE K506.  BITS <15:08> OF THE STACK LIMIT REGISTER AND
 4372                                  ;*      THE STACK POINTER ARE INCREMENTED FROM ZERO UP TO THE LAST
 4373                                  ;*      EXSISTING MEMORY LOCATION. FOR EACH VALUE IN BITS <15:08>
 4374                                  ;*      OF THE STACK POINTER ALL FOUR 'STACK BOUNDARY VALUES' ARE TESTED
 4375                                  ;*      FOR THE CORRECT INDICATION.  MEMORY MANAGEMENT IS DISABLED FOR
 4376                                  ;*      THIS TEST ONLY.  RELOCATION IS REENABLED FOR THE REST OF THE PROGRAM.
 4377                                  ;*
 4378                                  ;;*****************************************************************
 4379  030466                          TST37:
 4380  030466  000004                          SCOPE
 4381  030470  012737  031574  001444          MOV     #TST40,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
 4382                                                                  ;TEST FOR ESCAPE ON PARITY ERRORS
 4383  030476  104410                          TBIT0                   ;MAKE SURE T-BIT IS OFF FOR THIS TEST
 4384  030500  042737  000001  177572  20$:     BIC     #BIT0,@#MMR0    ;DISABLE MEMORY MANAGEMENT FOR THIS TEST
```

```
 4385  030506  005037  001202              CLR     $TMP2           ;INITIALIZE ERROR PRINT COUNTER
 4386  030512  012702  000010              MOV     #10,R2          ;INITIALIZE STACK POINTER VALUE
 4387  030516  012703  177400              MOV     #-400,R3        ;INITIALIZE STACK LIMIT REG. VALUE
 4388  030522  062702  000400      1$:     ADD     #400,R2         ;LOAD NEW STACK POINTER VALUE IN R2
 4389  030526  062703  000400              ADD     #400,R3         ;LOAD NEW STACK LIMIT REG VALUE IN R3
 4390  030532  020227  030500              CMP     R2,#20$         ;IS SP VALUE LESS THAN LOC. OF THIS
 4391                                                              ;TEST CODE?
 4392  030536  002404                      BLT     6$              ;BRANCH IF YES
 4393  030540  020227  031542              CMP     R2,#10$         ;IS SP VALUE GREATER THAN LOC. OF THIS
 4394                                                              ;TEST CODE?
 4395  030544  003001                      BGT     6$              ;BRANCH IF YES
 4396  030546  000765                      BR      1$              ;OTHERWISE GO BACK AND INCREASE VALUE OF
 4397                                                              ;SP SO CODE IS NOT AFFECTED
 4398  030550  005037  000000      6$:     CLR     @#0             ;CLEAR LOCATION 0 FOR RED ZONE CHECK
 4399  030554  005037  001366              CLR     STKEXP          ;NO STACK VIOLATIONS EXPECTED(STKEXP=0)
 4400  030560  012706  001100              MOV     #STACK,SP       ;INITIALIZE STACK POINTER
 4401  030564  012737  031542  000004  2$:  MOV     #10$,ERRVEC     ;SET ERROR POINTER TO 10$
 4402  030572  016204  177776              MOV     -2(R2),R4       ;SAVE STACK LOCATIONS TO BE USED
 4403  030576  016205  177774              MOV     -4(R2),R5       ;EXIT TEST IF EITHER LOC. TIMES OUT
 4404  030602  012737  030610  001110      MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
 4405  030610  012737  030774  000004  11$: MOV     #50$,ERRVEC     ;SET ERROR POINTER TO 50$
 4406  030616  010206                      MOV     R2,SP           ;LOAD STACK POINTER
 4407  030620  010337  177774              MOV     R3,STKLMT       ;LOAD STACK LIMIT REGISTER
 4408  030624  016666  177770  177770      MOV     -10(SP),-10(SP) ;REFERENCE LAST 'NO VIOLATION' ADDRESS
 4409  030632  005037  000000              CLR     @#0             ;CLEAR LOCATION 0 FOR RED ZONE CHECK
 4410  030636  012737  000001  001366      MOV     #1,STKEXP       ;EXPECT YELLOW ZONE VIOLATION(STKEXP=1)
 4411  030644  012737  030652  001110      MOV     #12$,$LPERR     ;SET LOOP ON ERROR POINTER TO 12$
 4412  030652  010206              12$:    MOV     R2,SP           ;LOAD STACK POINTER
 4413  030654  016666  177766  177766      MOV     -12(SP),-12(SP) ;REFERENCE FIRST 'YELLOW ZONE' ADDRESS
 4414  030662  000137  031454              JMP     60$             ;YELLOW ZONE VIOL. EXPECTED-GOT NONE
 4415  030666  012737  030674  001110  3$: MOV     #13$,$LPERR     ;SET LOOP ON ERROR POINTER TO 13$
 4416  030674  010206              13$:    MOV     R2,SP           ;LOAD STACK POINTER
 4417  030676  005037  000000              CLR     @#0             ;CLEAR LOCATION 0 FOR RED ZONE CHECK
 4418  030702  016666  177730  177730      MOV     -50(SP),-50(SP) ;REFERENCE LAST 'YELLOW ZONE' ADDRESS
 4419  030710  000137  031476              JMP     61$             ;YELLOW ZONE VIOL. EXPECTED-GOT NONE
 4420  030714  012737  030722  001110  4$: MOV     #14$,$LPERR     ;SET LOOP ON ERROR POINTER TO 14$
 4421  030722  012737  000002  001366  14$: MOV     #2,STKEXP       ;EXPECT RED ZONE VIOLATION(STKEXP=2)
 4422  030730  010206                      MOV     R2,SP           ;LOAD STACK POINTER
 4423  030732  005037  000000              CLR     @#0             ;CLEAR LOCATION 0 FOR RED ZONE CHECk
 4424  030736  016237  177726  001200      MOV     -52(R2),$TMP1   ;SAVE CONTENTS OF TEST LOC.
 4425  030744  005166  177726              COM     -52(SP)         ;REFERENCE FIRST 'RED ZONE' ADDRESS
 4426  030750  000137  031520              JMP     62$             ;RED ZONE VIOL. EXPECTED-GOT NONE
 4427  030754  013762  001200  177726  5$: MOV     $TMP1,-52(R2)   ;RESTORE CONTENTS OF TEST LOC.
 4428  030762  010462  177776              MOV     R4,-2(R2)       ;RESTORE STACK LOCATION USED
 4429  030766  010562  177774              MOV     R5,-4(R2)       ;RESTORE STACK LOCATION USED
 4430  030772  000653                      BR      1$              ;BRANCH UNTIL REACH NON EXSIST. MEM.
 4431
 4432
 4433                                  ;
 4434                                  ;
 4435                                  ;THE CODE BELOW IS RESPONSIBLE FOR ALL OF
 4436                                  ;THE ERROR REPORTING IN THIS TEST
 4437                                  ;THE TEST VALUES OF THE STACK LIMIT REGISTER,STACK POINTER, AND
 4438                                  ;THE STACK LOCATIONS TESTED ARE RESET TO THEIR NORMAL VALUES BUT
 4439                                  ;THEIR TEST VALUES ARE RESTORED BEFORE RETURNING TO THE TEST.
 4440                                  ;
```

```
4441
4442  030774  010637  001176          $0$:   MOV     SP,$TMP0        ;SAVE TEST VALUE OF STACK POINTER
4443  031000  016200  177776                 MOV     -2(R2),R0       ;SAVE TEST VALUES IN TEST LOC.S
4444  031004  016201  177774                 MOV     -4(R2),R1
4445  031010  010462  177776                 MOV     R4,-2(R2)       ;RESTORE ORIGINAL VALUES TO
4446  031014  010562  177774                 MOV     R5,-4(R2)       ;       TEST LOCATIONS
4447  031020  005037  177774                 CLR     STKLMT          ;CLEAR STACK LIMIT REG. FOR ERROR REPORT
4448  031024  012706  001100                 MOV     #STACK,SP       ;RESET STACK POINTER FOR ERROR REPORTING
4449  031030  005737  001366                 TST     STKEXP          ;WAS A VIOLATION EXPECTED
4450  031034  001012                         BNE     51$             ;IF SO GO DECIDE WHAT KIND
4451  031036  104041                         ERROR   41              ;OTHERWISE ERROR - NO VIOLATION EXPECTED
4452  031040  013706  001176                 MOV     $TMP0,SP        ;RESTORE STACK POINTER VALUE
4453  031044  010062  177776                 MOV     R0,-2(R2)       ;RESTORE TEST VALUES TO TEST LOC.S
4454  031050  010162  177774                 MOV     R1,-4(R2)
4455  031054  010337  177774                 MOV     R3,STKLMT       ;RESTORE STACK LIMIT REG. TEST VALUE
4456  031060  000006                         RTT                     ;RETURN  FROM ERROR
4457
4458
4459
4460  031062  022737  000001  001366  51$:   CMP     #1,STKEXP       ;WAS A YELLOW ZONE VIOLATION EXPECTED
4461  031070  001076                         BNE     54$             ;IF NOT WE WERE EXPECTING A RED ZONE
4462  031072  005737  000000                 TST     @#0             ;WAS LOCATION 0 CHANGED
4463  031076  001401                         BEQ     52$             ;BRANCH IF IT WASN'T
4464  031100  104043                         ERROR   43              ;EXPECTING YELLOW ZONE - GOT RED
4465  031102  022737  000005  001202  52$:   CMP     #5,$TMP2        ;HAVE 5 "ERROR LOG" ERRORS BEEN TYPED?
4466  031110  003447                         BLE     53$             ;IF YES,DON'T TYPE ANY MORE
4467  031112  105737  001446                 TSTB    FORTY           ;EXECUTING ON AN 11/40?
4468  031116  001044                         BNE     53$             ;BRANCH AROUND LOG READS IF YES
4469                                                                 ;SEE IF YELLOW ZONE LOGGED CORRECTLY
4470  031120  010037  001204                 MOV     R0,$TMP3        ;SAVE THE CONTENTS OF R0
4471  031124  012737  000100  001206         MOV     #RLJAM,$TMP4    ;SAVE THE ADDRESS OF THE REG. IN CASE
4472                                                                 ;OF AN ERROR
4473  031132  012737  010000  001210         MOV     #BIT12,$TMP5    ;ALSO SAVE THE EXPECTED CONTENTS
4474  031140  076600                         MED                     ;READ THE CONTENTS OF THE ERROR LOG REG.
4475  031142  000100                         RLJAM                   ;SPECIFIED BY "RLJAM"
4476  031144  032700  010000                 BIT     #BIT12,R0       ;WAS THE RIGHT BIT SET
4477  031150  001003                         BNE     .+10            ;BRANCH IF IT WAS
4478  031152  005237  001202                 INC     $TMP2           ;INCREMENT ERROR PRINT COUNT
4479  031156  104022                         ERROR   22              ;ERROR LOG REG. DID NOT HAVE CORRECT BIT SET
4480  031160  013700  001204                 MOV     $TMP3,R0        ;RESTORE THE CONTENTS OF R0
4481  031164  010037  001204                 MOV     R0,$TMP3        ;SAVE THE CONTENTS OF R0
4482  031170  012737  000101  001206         MOV     #RLSERV,$TMP4   ;SAVE THE ADDRESS OF THE REG. IN CASE
4483                                                                 ;OF AN ERROR
4484  031176  012737  000001  001210         MOV     #BIT0,$TMP5     ;ALSO SAVE THE EXPECTED CONTENTS
4485  031204  076600                         MED                     ;READ THE CONTENTS OF THE ERROR LOG REG.
4486  031206  000101                         RLSERV                  ;SPECIFIED BY "RLSERV"
4487  031210  032700  000001                 BIT     #BIT0,R0        ;WAS THE RIGHT BIT SET
4488  031214  001003                         BNE     .+10            ;BRANCH IF IT WAS
4489  031216  005237  001202                 INC     $TMP2           ;INCREMENT ERROR PRINT COUNT
4490  031222  104022                         ERROR   22              ;ERROR LOG REG. DID NOT HAVE CORRECT BIT SET
4491  031224  013700  001204                 MOV     $TMP3,R0        ;RESTORE THE CONTENTS OF R0
4492  031230  005737  000000          53$:   TST     @#0             ;DID YOU GET RED ZONE?
4493  031234  001070                         BNE     57$             ;RETURN DIFFERENTLY IF YES
4494  031236  013706  001176                 MOV     $TMP0,SP        ;RESTORE STACK POINTER VALUE
4495  031242  010062  177776                 MOV     R0,-2(R2)       ;RESTORE TEST VALUES TO  TEST LOC.S
4496  031246  010162  177774                 MOV     R1,-4(R2)
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4497  031252  010337  177774            MOV     R3,STKLMT       ;RESTORE STACK LIMIT REG. TEST VALUE
4498  031256  062762  000004  177774    ADD     #4,-4(R2)       ;FUDGE RETURN FROM TRAP
4499  031264  000006                    RTT                     ;RETURN FROM TRAP
4500
4501
4502
4503  031266  023762  001200  177726  54$:  CMP     $TMP1,-52(R2)   ;WAS INSTRUCTION ABORTED ON 'RED' VIOL.
4504  031274  001401                    BEQ     55$             ;BRANCH IF IT WAS EXECUTED
4505  031276  104045                    ERROR   45              ;RED ZONE DID NOT CAUSE ABORT
4506  031300  005737  001176          55$:  TST     $TMP0           ;IS TEST VALUE OF SP EQUAL TO LOC. 0
4507  031304  001401                    BEQ     56$             ;STACK SHOULD BE BUILT AT 0 ON A 'RED'
4508  031306  104046                    ERROR   46              ;EXPECTED RED ZONE - GOT YELLOW
4509  031310  022737  000005  001202  56$:  CMP     #5,$TMP2        ;HAVE 5 "ERROR LOG" ERRORS BEEN TYPED?
4510  031316  003437                    BLE     57$             ;IF YES, DON'T TYPE ANY MORE
4511  031320  105737  001446            TSTB    FORTY           ;EXECUTING ON AN 11/40?
4512  031324  001034                    BNE     57$             ;BRANCH AROUND LOG READS IF YES
4513                                                            ;SEE IF RED ZONE LOGGED CORRECTLY
4514  031326  010037  001204            MOV     R0,$TMP3        ;SAVE THE CONTENTS OF R0
4515  031332  012737  000100  001206    MOV     #RLJAM,$TMP4    ;SAVE THE ADDRESS OF THE REG. IN CASE
4516                                                            ;OF AN ERROR
4517  031340  012737  004010  001210    MOV     #004010,$TMP5   ;ALSO SAVE THE EXPECTED CONTENTS
4518  031346  076600                    MED                     ;READ THE CONTENTS OF THE ERROR LOG REG.
4519  031350  000100                    RLJAM                   ;SPECIFIED BY "RLJAM"
4520  031352  032700  004010            BIT     #004010,R0      ;WAS THE RIGHT BIT SET
4521  031356  001003                    BNE     .+10            ;BRANCH IF IT WAS
4522  031360  005237  001202            INC     $TMP2           ;INCREMENT ERROR PRINT COUNT
4523  031364  104022                    ERROR   22              ;ERROR LOG REG. DID NOT HAVE CORRECT BIT SET
4524  031366  013700  001204            MOV     $TMP3,R0        ;RESTORE THE CONTENTS OF R0
4525  031372  013737  177766  001406    MOV     @#CPUERR,PCPUER ;READ THE CPU ERROR REGISTER
4526  031400  032737  000004  001406    BIT     #BIT2,PCPUER    ;LOOK AT CONTENTS OF CPU ERROR REG.
4527  031406  001003                    BNE     57$             ;WAS RED ZONE VIOLATION REPORTED
4528  031410  005237  001202            INC     $TMP2           ;INCREMENT ERROR TYPE COUNT
4529  031414  104076                    ERROR   76              ;CPU ERROR REG.DID NOT REPORT RED ZONE
4530  031416  005737  000000          57$:  TST     @#0             ;DID WE GET RED ZONE?
4531  031422  001702                    BEQ     53$             ;RETURN DIFFERENTLY IF NO
4532  031424  013706  001176            MOV     $TMP0,SP        ;RESTORE STACK POINTER VALUE
4533  031430  010062  177776            MOV     R0,-2(R2)       ;RESTORE TEST VALUES TO TEST LOC.S
4534  031434  010162  177774            MOV     R1,-4(R2)
4535  031440  010337  177774            MOV     R3,STKLMT       ;RESTORE STACK LIMIT REG. TEST VALUE
4536  031444  062737  000004  000000    ADD     #4,@#0          ;FUDGE RETURN FROM TRAP
4537  031452  000006                    RTT                     ;RETURN FROM TRAP
4538
4539                                    ;
4540                                    ;THIS GROUP OF CODING IS ENTERED WHEN A STACK VIOLATION
4541                                    ;WAS EXPECTED BUT NONE OCCURRED
4542  031454  005037  177774          60$:  CLR     STKLMT          ;CLEAR STACK LIMIT REG. FOR ERROR REPORT
4543  031460  012706  001100            MOV     #STACK,SP       ;RESET STACK POINTER FOR ERROR REPORT
4544  031464  104042                    ERROR   42              ;YELLOW ZONE EXPECTED - GOT NONE
4545  031466  010337  177774            MOV     R3,STKLMT       ;RESTORE STACK LIMIT REG. TEST VALUE
4546  031472  000137  030666            JMP     3$              ;RETRUN TO TEST AT 3$
4547  031476  005037  177774          61$:  CLR     STKLMT          ;CLEAR STACK LIMIT REG. FOR ERROR REPORT
4548  031502  012706  001100            MOV     #STACK,SP       ;RESET STACK POINTER FOR ERROR REPORT
4549  031506  104042                    ERROR   42              ;YELLOW ZONE EXPECTED - GOT NONE
4550  031510  010337  177774            MOV     R3,STKLMT       ;RESTORE STACK LIMIT REG. TEST VALUE
4551  031514  000137  030714            JMP     4$              ;RETURN TO TEST AT 4$
4552  031520  005037  177774          62$:  CLR     STKLMT          ;CLEAR STACK LIMIT REG. FOR ERROR REPORT
```

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031524  012706  001100                  MOV     #STACK,SP       ;RESET STACK POINTER FOR ERROR REPORT
031530  104044                          ERROR   44              ;RED ZONE EXPECTED - GOT NONE
031532  010337  177774                  MOV     R3,STKLMT       ;RESTORE STACK LIMIT REG. TEST VALUE
031536  000137  030754                  JMP     5$              ;RETURN TO TEST AT 5$
                                ;
                                ;ONCE A NONEXSISTENT MEMORY LOCATION IS REACHED,
                                ;THE STACK POINTER IS RESET, MEMORY MANAGEMENT IS
                                ;REENABLED, AND THE TEST IS OVER

031542  012737  015160  000004  10$:    MOV     #CPUER,ERRVEC   ;RESTORE NORMAL CPU TRAP ROUTINE
                                                                ;GOT TIMEOUT, TEST IS OVER
031550  012706  001100                  MOV     #STACK,SP       ;RESET THE STACK POINTER
031554  052737  000001  177572          BIS     #BIT0,@#MMR0    ;REENABLE MEMORY MANAGEMENT
031562  005037  177774                  CLR     @#STKLMT        ;LEAVE STACK LIMIT REG. CLEAR
031566  012737  030500  001110          MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
031574                          70$:






                                ;;*************************************************************
                                ;*TEST 40       MEMORY MANAGEMENT REGISTERS ONLY CLOCKED ONCE IF MMR0 NOT CLEARED
                                ;*
                                ;*      AS LONG AS THE 'ABORT' OR 'LOCKUP' SIGNAL IS ASSERTED (THAT IS AFTER
                                ;*      AN ABORT AND UNTIL MMR0 BITS (15:13) ARE CLEARED) MMR0,
                                ;*      AND MMR2 SHOULD NOT BE CLOCKED.  THIS TEST CAUSES A NON-RESIDENT
                                ;*      ABORT, SAVES THE STATUS REGISTERS, CHANGES THE VECTOR TO 10$,
                                ;*      AND THEN CAUSES A PAGE LENGTH ABORT.  AT THE SECOND ABORT THE
                                ;*      STATUS REGISTERS ARE COMPARED WITH THEIR FIRST CONDITIONS. IF ANY
                                ;*      OF THEM CHANGE, THE OLD AND THE NEW CONDITIONS WILL BE REPORTED.
                                ;*
                                ;;*************************************************************
031574                          TST40:
031574  000004                          SCOPE
031576  012737  032014  001444          MOV     #TST41,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
                                                                ;TEST FOR ESCAPE ON PARITY ERRORS
031604  104411                          TBITR                   ;RESTORE T-BIT IF IT WAS ON BEFORE
                                                                ;THE LAST TEST
031606  012737  031614  001106          MOV     #20$,$LPADR     ;SET LOOP ADDRESS POINTER TO 20$
                                                                ;FOR ITERATION PASS
031614  012737  000000  172310  20$:    MOV     #000000,KIPDR4  ;MAP PAGE 4 NON-RESIDENT, AND PAGE
                                                                ;LENGTH OF 1 BLOCK
031622  012737  031662  000250          MOV     #5$,MMVEC       ;SET M.M. TRAP VECTOR TO 5$
031630  012737  000340  000252          MOV     #340,MMVEC+2    ;SET PRIORITY TO 7 GOTO KERNEL MODE
031636  012737  031644  001110          MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
031644  013700  100000          1$:     MOV     @#100000,R0     ;TRY TO READ THRU PAGE 4
                                                                ;THIS PAGE NON-RESIDENT SHOULD CAUSE
                                                                ;ABORT AND TRAP TO 5$.
031650  012737  031704  000250  2$:     MOV     #10$,MMVEC      ;SET M.M. TRAP VECTOR TO 10$
031656  013700  100100                  MOV     @#100100,R0     ;TRY TO READ FROM BLOCK 2 OF PAGE 4
                                                                ;THIS SHOULD ABORT AGAIN BUT NONE
                                                                ;OF THE MEMORY MANAGEMENT STATUS
                                                                ;REGISTERS SHOULD BE CLOCKED THIS TIME.
```

```
 4609  031662  013737  177572  001402  5$:     MOV     MMR0,PMMR0      ;READ MEMORY MANAGEMENT REGISTER 0
 4610  031670  013737  177576  001404          MOV     MMR2,PMMR2      ;READ MEMORY MANAGEMENT REGISTER 2
 4611  031676  012716  031650                  MOV     #2$,(KSP)       ;CHANGE RETURN ADDRESS TO 2$
 4612  031702  000006                          RTT                     ;GO BACK TO 2$ AND CAUSE PAGE FAULT
 4613
 4614
 4615  031704  012716  031712          10$:    MOV     #16$,(KSP)      ;CHANGE RETURN ADDRESS TO 16$
 4616  031710  000006                          RTT                     ;RETURN TO 16$ AND CONTINUE PROGRAM
 4617  031712  005037  001204          16$:    CLR     $TMP3           ;ERROR COUNTER, 3 POSSIBLE CMP FAILURES
 4618  031716  013737  177572  001176          MOV     MMR0,$TMP0      ;READ MEMORY MANAGEMENT REGISTER 0
 4619  031724  013737  177576  001202          MOV     MMR2,$TMP2      ;READ MEMORY MANAGEMENT REGISTER 2
 4620  031732  023737  001202  001404          CMP     $TMP2,PMMR2     ;SEE IF MMR2 CHANGED
 4621  031740  001402                          BEQ     12$             ;BRANCH IF MMR2 DIDN'T CHANGE
 4622  031742  005237  001204                  INC     $TMP3           ;ONE COMPARE FAILURE
 4623  031746  023737  001176  001402  12$:    CMP     $TMP0,PMMR0     ;SEE IF MMR0 CHANGED
 4624  031754  001402                          BEQ     13$             ;BRANCH IF MMR0 DIDN'T CHANGE
 4625  031756  005237  001204                  INC     $TMP3           ;ANOTHER COMPARE FAILURE
 4626  031762  005737  001204          13$:    TST     $TMP3           ;WERE THERE ANY ERRORS ON THIS TEST
 4627  031766  001401                          BEQ     19$             ;BRANCH IF NO ERRORS
 4628  031770  104050                          ERROR   50              ;AT LEAST ONE M.M. REG CHANGED
 4629  031772  042737  160556  177572  19$:    BIC     #160556,MMR0    ;CLEAR ALL ERROR BITS IN MMR0
 4630  032000  012737  015430  000250          MOV     #MMTRAP,MMVEC   ;PUT BACK REGULAR M.M. TRAP ROUTINE
 4631  032006  012737  031614  001110          MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
```

```
                        ;*****************************************************************
                        ;*TEST 41       ERROR-ON-ERROR, KT ABORT & RED ZONE
                        ;*      THIS TEST CREATES AN "ERROR-ON-ERROR" SITUATION BY CAUSING
                        ;*      A KT ABORT (READ-ONLY VIOL.) IN USER  MODE FOLLOWED BY
                        ;*      ODD ADDRESS VIOL. BY USER STK. PTR.  THE PSW PICKED UP FROM
                        ;*      "MMVEC+2" PUTS IT IN USER MODE.  THEN WHEN TRYING TO
                        ;*      PUSH THE OLD PSW AND PC ON THE USER STACK, AN ODD ADDR.
                        ;*      VIOLATION OCCURS (KSP=1100, STACK LIMIT REG. = 703).
                        ;*      THE KERNEL STACK POINTER SHOULD BE FORCED TO THE VALUE 4,
                        ;*      BUILDING A STACK AT LOC.S 0&2 ON THE 11/6X.  ON THE 11/40
                        ;*      THE USER STACK POINTER IS FORCED TO 4, BUT THE KERNEL STACK
                        ;*      POINTER IS USED TO BUILD THE STACK AT LOCATIONS 1074 &
                        ;*      1076.  THE PSW THAT WILL BE SAVED ON THE STACK
                        ;*      SHOULD BE THE ONE PRESENT AT THE TIME OF THE SECOND ERROR
                        ;*      (THE ONE FROM "MMVEC+2") FOR THE 11/6X, OR THE PSW PRESENT
                        ;*      AT THE TIME OF THE FIRST ERROR FOR THE 11/40
                        ;*          THE PC SAVED ON THE STACK, IN BOTH CASES
                        ;*      SHOULD BE THE UPDATED PC FROM THE FIRST ERROR (THE KT
                        ;*      ABORT INSTRUCTION).
                        ;*          ALSO, MMR0 SHOULD RECORD A R/O VIOL. & USER PAGE 0,
                        ;*      MMR2 SHOULD LOCK UP THE PC OF THE KT ABORT INSTRUCTION,
                        ;*      AND THE WHAMI AND LOG WHAMI REGISTERS SHOULD RECORD AN
                        ;*      "ERROR-ON-ERROR" ON THE 11/6X.
                        ;*
                        ;*****************************************************************
032014                  TST41:
                                SCOPE
032014  000004
032016  012737  032652  001444          MOV     #TST42,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
                                                                ;TEST FOR ESCAPE ON PARITY ERRORS
                                .EQUIV  BIT4,TBIT               ;BIT 4 OF P.S. IS T-BIT TRAPPING BIT
                                TBIT0                           ;MAKE SURE T-BIT IS OFF FOR THE NEXT 3 TESTS
032024  104410
032026  012737  000340  000006  20$:    MOV     #340,ERRVEC+2   ;SET PRIORITY OF ERRVEC TO 7
                                                                ;AND MAKE NEW MODE KERNEL
032034  012737  000000  177640          MOV     #000,UIPAR0     ;MAP USER PAGE 0 TO PHYS. 0
032042  012737  000200  177642          MOV     #200,UIPAR1     ;MAP USER PAGE 1 TO 4K -8K
032050  012737  000400  177644          MOV     #400,UIPAR2     ;MAP USER PAGE 2 TO 8K - 12K
032056  012737  000600  177646          MOV     #600,UIPAR3     ;MAP USER PAGE 3 TO 12K - 16K
032064  012737  007600  177656          MOV     #7600,UIPAR7    ;MAP USER PAGE 7 TO I/O PAGE
032072  012737  077406  177600          MOV     #77406,UIPDR0   ;MAKE USER PAGE 0 200 BLCKS, R/W
032100  012737  077406  177602          MOV     #77406,UIPDR1   ;MAKE USER PAGE 1 200 BLCKS, R/W
032106  012737  077406  177604          MOV     #77406,UIPDR2   ;MAKE USER PAGE 2 200 BLCKS, R/W
032114  012737  077406  177606          MOV     #77406,UIPDR3   ;MAKE USER PAGE 3 200 BLCKS, R/W
032122  012737  077406  177616          MOV     #77406,UIPDR7   ;MAKE USER PAGE 7 200 BLOCKS, R/W
032130  012737  032200  001110          MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
032136  012737  032204  000004          MOV     #10$,ERRVEC     ;SET ERRVEC TO 10$
032144  012737  140017  000252          MOV     #140017,MMVEC+2 ;LOAD NEW PSW INTO MMVEC+2
032152  012737  000600  177650          MOV     #600,UIPAR4     ;MAP USER PAGE 4 TO 12K
032160  012737  077402  177610          MOV     #77402,UIPDR4   ;MAKE USER PAGE 4 200 BLOCKS, READ-ONLY
032166  012737  140000  177776          MOV     #140000,PSW     ;GO TO USER MODE
032174  012706  000703                  MOV     #703,USP        ;SETUP USER STACK POINTER
                                                                ;TO CAUSE ODD ADDR. ERROR
032200  005237  100000          1$:     INC     @#100000        ;CREATE KT ABORT (R/O VIOL.) WHICH
                                                                ;PICKS UP A USER PSW AND THEN
                                                                ;CAUSES A ODD ADDR. VIOLATION.
                                                                ;THE DOUBLE ERROR SHOULD BE PROCESSED
                                                                ;AND THEN THE PROGRAM SHOULD CONTINUE
```

```
4688
4689  032204  016602  000002          10$:    MOV     2(KSP),R2       ;AT 10$ POINTED TO BY "ERRVEC"
4690  032210  011603                          MOV     (KSP),R3        ;SAVE PSW IN R2
4691  032212  012737  077406  177610          MOV     #77406,UIPDR4   ;SAVE PC IN R3
4692  032220  010601                          MOV     KSP,R1          ;MAKE USER PAGE 4 READ & WRITE
4693  032222  012711  032236                  MOV     #16$,(R1)       ;SAVE THE KERNEL STACK POINTER
4694  032226  012761  000340  000002          MOV     #340,2(R1)      ;SET RETURN PC TO 16$
4695  032234  000006                          RTT                     ;SET RETURN PSW TO KERNEL MODE
4696  032236  042761  000020  000002  16$:    BIC     #TBIT,2(R1)     ;RETURN FROM "ERR-ON-ERR" SERVICE
4697  032244  012706  001100                  MOV     #STACK,KSP      ;CLEAR T BIT IN SAVED PSW
4698  032250  005037  001200                  CLR     $TMP1           ;RESTORE THE STACK POINTER
4699  032254  012737  140017  001202          MOV     #140017,$TMP2   ;THIS IS THE ERROR COUNTER FLAG
4700                                                                  ;LOAD EXPECTED PS SAVED FOR 11/6X
4701  032262  105737  001446                  TSTB    FORTY           ;(PS FROM MMVEC+2 FETCHED BY KT ABORT)
4702  032266  001403                          BEQ     19$             ;EXECUTING ON AN 11/40?
4703  032270  012737  140000  001202          MOV     #140000,$TMP2   ;BRANCH IF NO
4704                                                                  ;LOAD EXPECTED PS SAVED FOR 11/40
4705  032276  023702  001202          19$:    CMP     $TMP2,R2        ;(PS AT TIME OF FIRST (KT) ERROR)
4706  032302  001402                          BEQ     18$             ;WAS CORRECT PS SAVED?
4707  032304  005237  001200                  INC     $TMP1           ;BRANCH IF PS IS CORRECT
4708  032310  022703  032204          18$:    CMP     #10$,R3         ;RIGHT PS IS ON STACK
4709                                                                  ;THE PC THAT SHOULD HAVE BEEN
4710                                                                  ;ON THE STACK IS THE UPDATED
4711                                                                  ;PC FROM THE KT ABORT INST.
4712  032314  001402                          BEQ     11$             ;(10$ = 1$+4)
4713  032316  005237  001200                  INC     $TMP1           ;BRANCH IF PC CORRECT
4714  032322  013737  177572  001402  11$:    MOV     MMR0,PMMR0      ;WRONG PC ON THE STACK
4715  032330  013737  177576  001404          MOV     MMR2,PMMR2      ;SAVE MMR0 FOR COMPARE
4716  032336  105737  001446                  TSTB    FORTY           ;SAVE MMR2, IT SHOULD EQUAL #10
4717  032342  001040                          BNE     21$             ;EXECUTING ON AN 11/40?
4718  032344  010037  001204                  MOV     R0,$TMP3        ;BRANCH IF YES
4719  032350  076600                          MED                     ;SAVE CONTENTS OF R0
4720  032352  000105                          RLWHAM                  ;READ LOG WHAMI REG.
4721  032354  030027  000004                  BIT     R0,#BIT2        ;WAS ERROR-ON-ERROR BIT SET?
4722  032360  001007                          BNE     17$             ;BRANCH IF YES
4723  032362  012737  000004  001210          MOV     #BIT2,$TMP5     ;SAVE EXPECTED CONTENTS FOR ERROR
4724  032370  012737  000105  001206          MOV     #RLWHAM,$TMP4   ;SAVE ADDRESS FOR ERROR
4725  032376  104022                          ERROR   22              ;ERR-ON-ERR BIT NOT SET IN
4726  032400                          17$:                            ;LOG WHAMI REG.
4727  032400  012737  000022  001206          MOV     #RWHAM,$TMP4    ;SAVE ADDR. FOR ERROR
4728  032406  012737  000004  001210          MOV     #BIT2,$TMP5     ;SAVE EXP. DATA FOR ERROR
4729  032414  076600                          MED                     ;MED READ THE WHAMI REG.
4730  032416  000022                          RWHAM
4731  032420  032700  000004                  BIT     #BIT2,R0        ;WAS "ERR-ON-ERR" BIT SET?
4732  032424  001001                          BNE     .+4             ;BRANCH IF YES
4733  032426  104022                          ERROR   22              ;"ERR-ON-ERR" BIT NOT SET
4734  032430  042700  000004                  BIC     #BIT2,R0        ;CLEAR BIT2 IN R0
4735  032434  076600                          MED                     ;WRITE ORIGINAL CONTENTS
4736  032436  000222                          WWHAM                   ;TO WHAMI WITH BIT2=0
4737  032440  013700  001204                  MOV     $TMP3,R0        ;RESTORE CONTENTS OF R0
4738  032444  022737  020151  001402  21$:    CMP     #020151,PMMR0   ;SHOULD HAVE READ-ONLY VIO.
4739                                                                  ;COMPLETED, PAGE 4, USER I-SPACE.
4740  032452  001402                          BEQ     12$             ;BRANCH IF 'CORRECT' CONDITION
4741  032454  005237  001200                  INC     $TMP1           ;WRONG ABORT CONDITION
4742  032460  105737  001446          12$:    TSTB    FORTY           ;EXECUTING ON AN 11/40?
4743  032464  001424                          BEQ     23$             ;BRANCH IF NO AROUND 11/40 CHECKS
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```
4744  032466  052737  140000  177776        BIS     #140000,PSW     ;GO TO USER MODE
4745  032474  010604                        MOV     USP,R4          ;READ THE USER STACK POINTER
4746  032476  042737  140000  177776        BIC     #140000,PSW     ;GO BACK TO KERNEL MODE
4747  032504  022704  000004                CMP     #4,R4           ;WAS USER STK. PTR. FORCED TO 4 ON 11/40?
4748  032510  001404                        BEQ     22$             ;BRANCH IF YES
4749  032512  005237  001200                INC     $TMP1           ;USP ON 11/40 IS NOT CORRECT
4750  032516  010401                        MOV     R4,R1           ;SAVE VALUE OF USP FOR TYPEOUT
4751  032520  000413                        BR      13$             ;DON'T BOTHER CHECKING KSP IF USP WAS WRONG
4752  032522  022701  001074        22$:    CMP     #KERSTK-4,R1    ;WAS PC & PSW SAVED ON 11/40 KERNEL STACK?
4753  032526  001410                        BEQ     13$             ;BRANCH IF YES
4754  032530  005237  001200                INC     $TMP1           ;PC & PSW NOT SAVED ON 11/40 KERNEL STACK
4755  032534  000405                        BR      13$             ;BRANCH AROUND 11/6X KSP CHECK
4756  032536                        23$:
4757  032536  022701  000000                CMP     #0,R1           ;THE KER. STK. POINTER
4758                                                                ;SHOULD HAVE BEEN = 0
4759                                                                ;AFTER ERR-ON-ERR TRAP TO LOC. 4
4760  032542  001402                        BEQ     13$             ;BRANCH IF KSP IS CORRECT
4761  032544  005237  001200                INC     $TMP1           ;KSP IS NOT CORRECT
4762  032550  022737  032200  001404  13$:  CMP     #1$,PMMR2       ;SEE IF MMR2 EQUALS ADDRS. OF KT ABORT
4763  032556  001402                        BEQ     14$             ;BRANCH IF ADDRESS IS CORRECT
4764  032560  005237  001200                INC     $TMP1           ;MMR2 HAS THE WRONG ADDRESS
4765  032564  005737  001200        14$:    TST     $TMP1           ;DID ANY OF THE COMPARES FAIL?
4766  032570  001401                        BEQ     15$             ;BRANCH IF ALL COMPARES SUCCEEDED
4767  032572  104047                        ERROR   47              ;AT LEAST ONE COMPARE FAILED
4768                                                                ;IF USER STK. PTR. WRONG ON 11/40,
4769                                                                ;THE KERNEL STK. PTR. WAS NOT CHECKED
4770  032574  052737  000340  177776  15$:   BIS     #340,PSW        ;NORMAL PRIORITY IS 7
4771  032602  052737  140000  177776        BIS     #140000,PSW     ;GO TO USER MODE TO RESET PTR
4772  032610  012706  000700                MOV     #700,USP        ;RESTORE USER STK PTR TO 700
4773  032614  042737  140000  177776        BIC     #140000,PSW     ;RETURN TO KERNEL MODE
4774  032622  012737  000340  000006        MOV     #340,ERRVEC+2   ;RESTORE CORRECT PS TO ERROR VECTOR
4775  032630  012737  032026  001110        MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
4776  032636  042737  160556  177572        BIC     #160556,MMR0    ;CLEAR ERROR CONDITION IN MMR0
4777  032644  012737  015160  000004        MOV     #CPUER,ERRVEC   ;RESTORE NORMAL CPU TRAP ROUTINE
```

```
                                        ;;*****************************************************************
                                        ;*TEST 42        USER MODE, ABORT VECTOR FROM KERNEL SPACE
                                        ;*
                                        ;*       THIS TEST DOES AN ABORT FROM USER MODE.  THE VECTOR
                                        ;*       SHOULD BE PICKED UP FROM KERNEL SPACE
                                        ;*       FORCING KERNEL MODE DURING THE ABORT SEQUENCE.
                                        ;*
                                        ;*       THE 'HALTS' IN THIS TEST ARE SPACE FILLERS AND SHOULD NEVER BE
                                        ;*       REACHED, IF USER MODE IS ENABLED PROPERLY
                                        ;*
                                        ;*
                                        ;;*****************************************************************
032652                                  TST42:
032652  000004                                  SCOPE
032654  012737  033170  001444                 MOV     #TST43,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
                                                                        ;TEST FOR ESCAPE ON PARITY ERRORS
032662  005037  001364          20$:    CLR     MMEXP                   ;NOT EXPECTING ANY M.M. TRAPS YET
032666  012700  077406                  MOV     #77406,R0               ;PAGE LENGTH-200 BLOCKS EXPAND UP
                                                                        ;RESIDENT READ/WRITE
032672  010037  177600                  MOV     R0,UIPDR0               ;LOAD USER PAGE 0
032676  010037  177602                  MOV     R0,UIPDR1               ;LOAD USER PAGE 1
032702  010037  177604                  MOV     R0,UIPDR2               ;LOAD USER PAGE 2
032706  010037  177606                  MOV     R0,UIPDR3               ;LOAD USER PAGE 3
032712  010037  177616                  MOV     R0,UIPDR7               ;LOAD USER PAGE 7
032716  012737  000001  177640          MOV     #1,UIPAR0               ;MAP USER PAGE 0 TO 00100
032724  012737  000201  177642          MOV     #201,UIPAR1             ;MAP USER PAGE 1 TO 20100
032732  012737  000401  177644          MOV     #401,UIPAR2             ;MAP USER PAGE 2 TO 40100
032740  012737  000601  177646          MOV     #601,UIPAR3             ;MAP USER PAGE 3 TO 60100
032746  012737  007600  177656          MOV     #7600,UIPAR7            ;MAP USER PAGE 7 TO I/O PAGE
032754  012737  077400  177612          MOV     #77400,UIPDR5           ;MAKE USER PAGE 5 NON-RESIDENT
032762  012737  000600  177652          MOV     #600,UIPAR5             ;MAP USER PAGE 5 TO 12K
032770  012737  015572  000350          MOV     #USEVEC,350             ;USER SPACE VECTOR
032776  012737  000000  000352          MOV     #000,352                ;USER SPACE PSW = 000
033004  012737  033012  001110          MOV     #5$,$LPERR              ;SET LOOP ON ERROR POINTER TO 5$
033012  012737  140000  177776  5$:     MOV     #140000,PSW             ;GO TO USER MODE.
                                                                        ;THE NEXT INSTRUCTION EXECUTED IS AT
                                                                        ;3$.  THE ADDRESS IS 100 OCTAL BYTES
                                                                        ;GREATER THAN THE ADDRESS AT 1$.
033020  104051                  1$:     ERROR   51                      ;DIDN'T GO TO USER MODE
033022  005037  177776                  CLR     PSW                     ;GO BACK INTO KERNEL MODE
033026  000137  033070                  JMP     2$                      ;GO TO EXIT OF TEST
033032  000000                          HALT                            ;THE NEXT 'SEVERAL' HALTS SHOULDN'T
033034  000000                          HALT                            ;EVER BE REACHED
033036  000000                          HALT                            ;EVER BE REACHED
033040  000000                          HALT                            ;EVER BE REACHED
033042  000000                          HALT                            ;EVER BE REACHED
033044  000000                          HALT                            ;EVER BE REACHED
033046  000000                          HALT                            ;EVER BE REACHED
033050  000000                          HALT                            ;EVER BE REACHED
033052  000000                          HALT                            ;EVER BE REACHED
033054  000000                          HALT                            ;EVER BE REACHED
033056  000000                          HALT                            ;EVER BE REACHED
033060  000000                          HALT                            ;EVER BE REACHED
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4834  033062  000000                          HALT                    ;EVER BE REACHED
4835  033064  000000                          HALT                    ;EVER BE REACHED
4836  033066  000000                          HALT                    ;EVER BE REACHED
4837  033070  012737  015430  000250  2$:     MOV     #MMTRAP,MMVEC   ;RESTORE NORMAL M.M. TRAP ROUTINE
4838  033076  022737  100153  001402          CMP     #100153,PMMR0                   ;EXPECTING NON-RESIDENT PAGE 5
4839                                                                                  ;ABORT IN USER MODE I-SPACE
4840  033104  001401                          BEQ     11$                             ;BRANCH IF CORRECT COND
4841  033106  104052                          ERROR   52                              ;ABORT CONDITION INCORRECT
4842  033110  012737  032662  001110  11$:    MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
4843  033116  000424                          BR      TST43           ;;BRANCH TO NEXT TEST
4844  033120  012737  015542  000150  3$:     MOV     #KERVEC,<MMVEC-100>             ;SET UP KERNEL SPACE VECTOR
4845  033126  012737  000340  000152          MOV     #340,<MMVEC+2-100>              ;KERNEL SPACE PSW = 340
4846  033134  013700  120000                  MOV     @#120000,R0                     ;READ FROM PAGE 5, USER SPACE
4847  033140  000405                          BR      10$                             ;GO SEE IF GOT EXPECTED ABORT
4848                                                                                  ;AFTER WE'VE JUST RETURNED
4849                                                                                  ;FROM "KERVEC"
4850                                                                                  ;THESE HALTS SHOULDN'T
4851  033142  000000                          HALT                                    ;EVER BE REACHED
4852  033144  000000                          HALT
4853  033146  000000                          HALT
4854  033150  000000                          HALT
4855  033152  000000                          HALT
4856  033154  042737  160556  177572  10$:    BIC     #160556,MMR0                    ;CLEAR MMR0 FOR NEXT TEST
4857  033162  012737  000340  177776          MOV     #340,PSW        ;GO BACK INTO KERNEL MODE NOW
4858                                          ;THE NEXT INSTRUCTION TO BE EXECUTED
4859                                          ;IS AT LABEL 2$
4860
4861
4862                          ;;*****************************************************************
4863                          ;*TEST 43       SECOND BIT TEST OF MEMORY MANAGEMENT REGISTER 2
4864                          ;*
4865                          ;*      THIS TEST MAPS USER PAGES 3,4,5, AND 6 TO 12K READ-ONLY.
4866                          ;*      A VIRTUAL ADDRESS IS THEN FORMED IN REGISTER 1 USING BITS
4867                          ;*      <15:13> TO SELECT PAR/PDRS 3 THRU 6 AND A "1" WHICH IS SHIFTED
4868                          ;*      THRU BITS <12:1>.  THE INSTRUCTION "INC (R1)" (CODED AS 005211)
4869                          ;*      IS THEN PLACED AT THE VIRTUAL ADDRESS IN R1 CAUSING A KT-
4870                          ;*      READ ONLY VIOLATION WHEN EXECUTED.  THE CONTENTS OF MMR2 ARE
4871                          ;*      TESTED ALONG WITH BITS <06:05> AND <03:01> OF MMR0.
4872                          ;*
4873                          ;;*****************************************************************
4874  033170                  TST43:
4875  033170  000004                  SCOPE
4876  033172  012737  033674  001444          MOV     #TST44,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
4877                                                                  ;TEST FOR ESCAPE ON PARITY ERRORS
4878  033200  012737  000002  001212          MOV     #2,$TIMES       ;;DO 2 ITERATIONS
4879  033206                  20$:
4880  033206  012737  077406  172300          MOV     #77406,KIPDR0   ;MAKE KERNEL I PAGE 0 200 BLOCKS, R/W
4881  033214  012737  077406  172302          MOV     #77406,KIPDR1   ;MAKE KERNEL I PAGE 1 200 BLOCKS, R/W
4882  033222  012737  077406  172304          MOV     #77406,KIPDR2   ;MAKE KERNEL I PAGE 2 200 BLOCKS, R/W
4883  033230  012737  077406  172306          MOV     #77406,KIPDR3   ;MAKE KERNEL I PAGE 3 200 BLOCKS, R/W
4884  033236  012737  077406  172316          MOV     #77406,KIPDR7   ;MAKE KERNEL I PAGE 7 200 BLOCKS, R/W
4885  033244  012737  000000  172340          MOV     #000,KIPAR0     ;MAP KERNEL I PAGE 0 TO 0 - 4K
4886  033252  012737  000200  172342          MOV     #200,KIPAR1     ;MAP KERNEL I PAGE 1 TO 4K - 8K
4887  033260  012737  000400  172344          MOV     #400,KIPAR2     ;MAP KERNEL I PAGE 2 TO 8K - 12K
4888  033266  012737  000600  172346          MOV     #600,KIPAR3     ;MAP KERNEL I PAGE 3 TO 12K - 16K
4889  033274  012737  007600  172356          MOV     #7600,KIPAR7    ;MAP KERNEL I PAGE 7 TO THE I/O PAGE
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4890  033302  012737  000001  177572          MOV     #BIT0,MMR0      ;ENABLE 18-BIT RELOCATION IF NOT ON
4891  033310  012700  077406                  MOV     #77406,R0
4892  033314  010037  172310                  MOV     R0,KIPDP4       ;MAP KERNEL PAGE 4 READ-WRITE
4893  033320  010037  172312                  MOV     R0,KIPDR5       ;MAP KERNEL PAGE 5 READ-WRITE
4894  033324  010037  172314                  MOV     R0,KIPDR6       ;MAP KERNEL PAGE 6 READ-WRITE
4895  033330  012700  000600                  MOV     #600,R0
4896  033334  010037  172350                  MOV     R0,KIPAR4       ;MAP KERNEL PAGE 4 TO 12K
4897  033340  010037  172352                  MOV     R0,KIPAR5       ;MAP KERNEL PAGE 5 TO 12K
4898  033344  010037  172354                  MOV     R0,KIPAR6       ;MAP KERNEL PAGE 6 TO 12K
4899  033350  012737  077402  177606          MOV     #77402,UIPDR3   ;MAP USER PAGE 3 READ-ONLY
4900  033356  012737  077402  177610          MOV     #77402,UIPDR4   ;MAP USER PAGE 4 READ-ONLY
4901  033364  012737  077402  177612          MOV     #77402,UIPDR5   ;MAP USER PAGE 5 READ-ONLY
4902  033372  012737  077402  177614          MOV     #77402,UIPDR6   ;MAP USER PAGE 6 READ-ONLY
4903  033400  012737  000000  177640          MOV     #000,UIPAR0     ;MAP USER PAGE 0 TO 0-4K
4904  033406  012737  000200  177642          MOV     #200,UIPAR1     ;MAP USER PAGE 1 TO 4K
4905  033414  012737  000400  177644          MOV     #400,UIPAR2     ;MAP USER PAGE 2 TO 8K
4906  033422  012737  000600  177646          MOV     #600,UIPAR3     ;MAP USER PAGE 3 TO 12K
4907  033430  012737  000600  177650          MOV     #600,UIPAR4     ;MAP USER PAGE 4 TO 12K
4908  033436  012737  000600  177652          MOV     #600,UIPAR5     ;MAP USER PAGE 5 TO 12K
4909  033444  012737  000600  177654          MOV     #600,UIPAR6     ;MAP USER PAGE 6 TO 12K
4910  033452  012737  033510  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
4911  033460  012700  140000                  MOV     #140000,R0      ;THIS WILL FORCE USER MODE WHEN USED
4912                                                                  ;AS A PROCESSOR STATUS
4913  033464  012704  060000                  MOV     #60000,R4       ;SETUP BITS <15:13> IN R4 SO V.A. WILL
4914                                                                  ;INITIALLY SELECT PAR/PDR 3
4915  033470  012737  033534  000250          MOV     #10$,MMVEC      ;SET M.M. TRAP VECTOR TO 10$
4916  033476  012737  000340  000252          MOV     #340,MMVEC+2    ;MAKE SURE TRAP TAKES YOU TO KERNEL
4917  033504  012701  000002          2$:     MOV     #2,R1           ;PUT TEST BIT AT STARTING POSTION(BIT 1)
4918  033510  042701  160000          3$:     BIC     #160000,R1      ;CLEAR BITS <15:13> SO APF SELECT BITS CAN
4919                                                                  ;BE RESET
4920  033514  050401                          BIS     R4,R1           ;SET BITS <15:13> TO SELECT PAR/PDR BEING USED
4921  033516  011137  001176                  MOV     (R1),$TMP0      ;SAVE CONTENTS OF TEST LOCATION
4922  033522  012711  005211                  MOV     #5211,(R1)      ;PUT "ABORT INSTRUCTION" AT TEST LOC.
4923  033526  010046                          MOV     R0,-(KSP)       ;PUSH USER PS ON STACK
4924  033530  010146                          MOV     R1,-(KSP)       ;PUSH USER'S VIRTUAL PC ON STACK
4925  033532  000002                          RTI                     ;RETURN TO USER MODE
4926                                                                  ;THE FIRST INSTRUCTION FETCH WILL
4927                                                                  ;CAUSE A NON-RESIDENT ABORT AND LOCK
4928                                                                  ;MMR2 SO THAT ALL BITS CAN BE CHECKED.
4929
4930
4931
4932  033534  062706  000004          10$:    ADD     #4,KSP          ;CLEAN UP STACK FOR NEXT TIME
4933  033540  013711  001176                  MOV     $TMP0,(R1)      ;RESTORE CONTENTS OF TEST LOCATION
4934  033544  013737  177576  001404          MOV     MMR2,PMMR2      ;READ MMR2 TO TEMP LOCATION
4935  033552  013737  177572  001402          MOV     MMR0,PMMR0      ;READ MMR0 TO TEMP LOCATION
4936  033560  020137  001404                  CMP     R1,PMMR2        ;SEE IF MMR2 LOCKED CORRECT V. A.
4937  033564  001401                          BEQ     11$             ;BRANCH IF MMR2 HAS RIGHT V.A.
4938  033566  104053                          ERROR   53              ;WRONG V.A.
4939  033570  005002                  11$:    CLR     R2              ;R2 WILL GET THE VIRTUAL PAGE NO.
4940  033572  010103                          MOV     R1,R3           ;COPY VIRTUAL ADDRESS INTO R3
4941  033574  012705  000003                  MOV     #3,R5           ;COMBINED LEFT SHIFT <R2,R3> 3 BITS
4942  033600  000241                  4$:     CLC
4943  033602  006303                          ASL     R3
4944  033604  006102                          ROL     R2
4945  033606  077504                          SOB     R5,4$
```

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4946  033610  006102                          ROL     R2              ;ADJUST PAGE NUMBER
4947  033612  052702  020141                  BIS     #020141,R2      ;SET OTHER EXPECTED BITS IN MMR0
4948  033616  020237  001402                  CMP     R2,PMMR0        ;SEE IF MMR0 RECORDED CORRECT PAGE NO.
4949  033622  001401                          BEQ     12$             ;BRANCH IF PAGE NUMBER WAS CORRECT
4950  033624  104054                          ERROR   54              ;WRONG PAGE NO. IN MMR0
4951  033626  042737  160556  177572  12$:    BIC     #160556,MMR0    ;CLEAR ALL ERROR BITS IN MMR0
4952  033634  032701  010000                  BIT     #BIT12,R1       ;HAS BIT BEEN SHIFTED ALL THE WAY THRU
4953  033640  001002                          BNE     13$             ;BRANCH IF IT WAS
4954  033642  006301                          ASL     R1              ;SHIFT BIT ONE POSITION LEFT
4955  033644  000721                          BR      3$              ;GO AND TRY THIS VIRTUAL ADDRESS
4956  033646  062704  020000          13$:    ADD     #20000,R4       ;INCREASE R4 TO SELECT NEXT PAR/PDR
4957  033652  022704  160000                  CMP     #160000,R4      ;HAVE ALL PAGES(3,4,5,6) BEEN USED
4958  033656  001312                          BNE     2$              ;CONTINUE IF THEY HAVEN'T
4959  033660  012737  015430  000250          MOV     #MMTRAP,MMVEC   ;PUT BACK REGULAR M.M. TRAP ROUTINE
4960  033666  012737  033206  001110          MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
4961
4962
4963
4964
4965                                  .SBTTL  ************ ENTRY POINT 6 --- STARTING ADDRESS 224 ************
4966                                  .SBTTL  **********  W BIT LOGIC TEST AND DUAL MAPPING TESTS *********
4967                                  ;*
4968                                  ;*      THIS GROUP OF TESTS CHECKS OUT THE W-BIT LOGIC
4969                                  ;*      AND THEN USES THAT LOGIC TO VERIFY THAT THERE IS NO
4970                                  ;*      DUAL MAPPING OF PAR/PDR PAIRS BETWEEN GROUPS OR INSIDE A GROUP.
4971                                  ;*      ALL W-BITS ARE SET TO ENSURE THAT THERE ISN'T A BAD
4972                                  ;*      CHIP IN THE PDR'S.
4973                                  ;*
4974
4975
4976                                  ;;*******************************************************************
4977                                  ;*TEST 44        TEST W-BIT LOGIC
4978                                  ;*
4979                                  ;*      THIS TEST CHECKS ALL THE LOGIC FOR THE W-BIT ON
4980                                  ;*      'K504'.  THE BITS ARE SET ONE AT A TIME THEN A REFERENCE
4981                                  ;*      TO THAT PAGE CAUSING AN ABORT IS MADE TO SEE IF THE BIT REMAINS
4982                                  ;*      SET.  LAST EITHER THE PAR OR PDR IS WRITTEN TO SEE THAT THE
4983                                  ;*      BIT IS CLEARED DURING A PAR OR PDR LOAD.
4984                                  ;*
4985                                  ;;*******************************************************************
4986  033674                          TST44:
4987  033674  000004                          SCOPE
4988  033676  012737  034354  001444          MOV     #TST45,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
4989                                                                  ;TEST FOR ESCAPE ON PARITY ERRORS
4990  033704  104411                          TBITR                   ;RESTORE T-BIT IF IT WAS ON BEFORE THE
4991                                                                  ;LAST 3 TESTS
4992  033706  012737  034040  001106  ENTPT6: MOV     #20$,$LPADR     ;SET LOOP ADDRESS POINTER TO 20$
4993  033714  012737  034040  001110          MOV     #20$,$LPERR     ;SET LOOP ON ERROR POINTER TO 20$
4994  033722  012737  000044  001102          MOV     #44,$TSTNM      ;LOAD TEST NUMBER INTO MEMORY
4995  033730  013777  001102  145204          MOV     $TSTNM,@DISPLAY ;DISPLAY TEST NUMBER FOR THIS TEST
4996  033736  012737  077406  172300          MOV     #77406,KIPDR0   ;MAKE KERNEL I PAGE 0 200 BLOCKS, R/W
4997  033744  012737  077406  172302          MOV     #77406,KIPDR1   ;MAKE KERNEL I PAGE 1 200 BLOCKS, R/W
4998  033752  012737  077406  172304          MOV     #77406,KIPDR2   ;MAKE KERNEL I PAGE 2 200 BLOCKS, R/W
4999  033760  012737  077406  172306          MOV     #77406,KIPDR3   ;MAKE KERNEL I PAGE 3 200 BLOCKS, R/W
5000  033766  012737  077406  172316          MOV     #77406,KIPDR7   ;MAKE KERNEL I PAGE 7 200 BLOCKS, R/W
5001  033774  012737  000000  172340          MOV     #000,KIPAR0     ;MAP KERNEL I PAGE 0 TO 0 - 4K
```

```
5002  034002  012737  000200  172342          MOV     #200,KIPAR1     ;MAP KERNEL I PAGE 1 TO 4K - 8K
5003  034010  012737  000400  172344          MOV     #400,KIPAR2     ;MAP KERNEL I PAGE 2 TO 8K - 12K
5004  034016  012737  000600  172346          MOV     #600,KIPAR3     ;MAP KERNEL I PAGE 3 TO 12K - 16K
5005  034024  012737  007600  172356          MOV     #7600,KIPAR7    ;MAP KERNEL I PAGE 7 TO THE I/O PAGE
5006  034032  012737  000001  177572          MOV     #BIT0,MMR0      ;ENABLE 18-BIT RELOCATION IF NOT ON
5007                                          .EQUIV  BIT6,WBIT       ;LABEL 'WBIT' IS EQUIVALENT TO BIT 6
5008  034040  012737  000006  172310  20$:    MOV     #00006,KIPDR4   ;PAGE 4 HAS A PAGE LENGTH OF 1
5009  034046  012737  000600  172350          MOV     #600,KIPAR4     ;MAP PAGE 4 TO 12K
5010  034054  012737  034344  000250          MOV     #10$,MMVEC      ;SET M.M. TRAP VECTOR TO 10$
5011  034062  012737  034070  001110          MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 11$
5012  034070  012737  012345  100000  1$:     MOV     #12345,@#100000 ;WRITE INTO PAGE 4
5013  034076  013737  172310  001176          MOV     KIPDR4,$TMP0    ;READ PDR 4 TO CHECK W-BIT
5014  034104  032737  000100  001176          BIT     #WBIT,$TMP0     ;SEE IF W-BIT IS SET
5015  034112  001001                          BNE     2$              ;BRANCH IF W-BIT IS SET
5016  034114  104055                          ERROR   55              ;W-BIT NOT SET
5017  034116  012737  034124  001110  2$:     MOV     #12$,$LPERR     ;SET LOOP ON ERROR POINTER TO 12$
5018  034124  012737  012345  100100  12$:    MOV     #12345,@#100100 ;WRITE INTO PAGE 4, BLOCK 2
5019  034132  013737  172310  001176          MOV     KIPDR4,$TMP0    ;READ PDR 4TO SEE IF W-BIT REMAINED SET
5020  034140  032737  000100  001176          BIT     #WBIT,$TMP0     ;SEE IF W-BIT REMAINED SET
5021  034146  001001                          BNE     3$              ;BRANCH IF W-BIT IS SET
5022  034150  104056                          ERROR   56              ;W-BIT DID NOT REMAIN SET
5023  034152  012737  034160  001110  3$:     MOV     #13$,$LPERR     ;SET LOOP ON ERROR POINTER TO 13$
5024  034160  112737  000004  172310  13$:    MOVB    #004,KIPDR4     ;CHANGE PAGE 4'S ACCESS CONTROL FIELD
5025  034166  013737  172310  001176          MOV     KIPDR4,$TMP0    ;READ PDR 4 TO CHECK W-BIT CLEARING
5026  034174  022737  000004  001176          CMP     #00004,$TMP0    ;SEE IF W-BIT GOT CLEARED ON PDR WRITE
5027  034202  001401                          BEQ     7$              ;BRANCH IF W-BIT GOT CLEARED
5028  034204  104057                          ERROR   57              ;W-BIT DIDN'T GET CLEARED ON PDR WRITE
5029  034206  012737  034214  001110  7$:     MOV     #17$,$LPERR     ;SET LOOP ON ERROR POINTER TO 17$
5030  034214  013737  177776  001176  17$:    MOV     PSW,$TMP0       ;READ PROCESSOR STATUS WORD
5031  034222  013737  001176  177776          MOV     $TMP0,PSW       ;WRITE TO PSW TO CHECK 'GOOD DATO L'
5032  034230  013737  172316  001176          MOV     KIPDR7,$TMP0    ;READ PDR 7 TO CHECK W-BIT
5033  034236  105737  001446                  TSTB    FORTY           ;EXECUTING ON AN 11/40?
5034  034242  001406                          BEQ     21$             ;BRANCH IF NO
5035  034244  032737  000100  001176          BIT     #WBIT,$TMP0     ;DID W-BIT SET FOR 11/40 PSW WRITE?
5036  034252  001007                          BNE     8$              ;BRANCH IF W-BIT SET
5037  034254  104060                          ERROR   60              ;W-BIT DIDN'T SET ON 11/40 PSW WRITE
5038  034256  000405                          BR      8$
5039  034260                          21$:
5040  034260  032737  000100  001176          BIT     #WBIT,$TMP0     ;DID W-BIT STAY 0 FOR 11/6X PSW WRITE?
5041  034266  001401                          BEQ     8$              ;BRANCH IF W-BIT WAS NOT SET
5042  034270  104060                          ERROR   60              ;W-BIT DID GET SET ON 11/6X
5043  034272  012737  034300  001110  8$:     MOV     #18$,$LPERR     ;SET LOOP ON ERROR POINTER TO 18$
5044  034300  012737  077406  172310  18$:    MOV     #77406,KIPDR4   ;LOAD AN INTERNAL REGISTER, SHOULDN'T
5045                                                                  ;AFFECT PAGE 7'S W-BIT
5046  034306  013737  172316  001176          MOV     KIPDR7,$TMP0    ;READ PDR 7 TO CHECK W-BIT AGAIN
5047  034314  032737  000100  001176          BIT     #WBIT,$TMP0     ;SEE IF W-BIT CLEAR
5048  034322  001401                          BEQ     9$              ;BRANCH IF W-BIT IS STILL CLEAR
5049  034324  104061                          ERROR   61              ;W-BIT SET AFTER WRITING PDR 4 ON 11/6X
5050  034326  012737  034040  001110  9$:     MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
5051  034334  012737  015430  000250          MOV     #MMTRAP,MMVEC   ;RESTORE NORMAL M.M. TRAP ROUTINE
5052  034342  000404                          BR      TST45           ;;BRANCH TO NEXT TEST
5053
5054  034344  042737  160556  177572  10$:    BIC     #160556,MMR0    ;CLEAR MMR0 FOR NEXT READ OR WRITE
5055  034352  000002                          RTI                     ;RETURN TO TEST AND CHECK A OR W BIT
5056
5057
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5058                                    ;*
5059                                    ;*      THESE NEXT TWO (2) TESTS
5060                                    ;*      CHECK FOR DUAL MAPPING
5061                                    ;*      AMONG GROUPS OR INSIDE A GROUP OF PAR/PDR'S.  THIS IS DONE BY
5062                                    ;*      WRITING ONLY ONE PAGE IN A MODE OF OPERATION THEN CHECKING ALL
5063                                    ;*      PDR'S TO SEE THAT ONLY THE ONE UNDER TEST HAS ITS W
5064                                    ;*      BIT SET.  THIS TEST IS RUN IN ALL MODES,
5065                                    ;*      SO THAT ALL THE REGISTER
5066                                    ;*      PAIRS ARE TESTED.
5067                                    ;*
5068                                    ;**************************************************************
5069                                    ;*TEST 45       DUAL MAPPING KERNEL MODE SPACE
5070                                    ;*
5071                                    ;*      THIS TEST STARTS BY LOADING ALL THE P.D.R.'S WITH 77406
5072                                    ;*      (4K PAGE,READ/WRITE).  THEN THE VIRTUAL ADDRESS IS SET TO
5073                                    ;*      010200 AND THAT WORD IS WRITTEN INTO ITSELF.  THIS WRITE WILL
5074                                    ;*      SET THE W BIT IN THE KERNEL SPACE P.D.R. UNDER TEST.  NOW ALL OF THE
5075                                    ;*      P.D.R.'S ARE COMPARED WITH 77706 AND ANY THAT MATCH, EXCEPT THE
5076                                    ;*      ONE THAT IS UNDER TEST, ARE REPORTED AS DUAL MAPPING ERRORS.
5077                                    ;*      KERNEL PAR7 IS MAPPED TO 12K AND KERNEL PAR6 TO I/O PAGE DURING THE WRITE SINCE
5078                                    ;*      WRITING TO REGISTERS INTERNAL TO THE CPU ON THE 11/6X WILL NOT SET THE W BIT
5079                                    ;*      AND ANY OTHER EXSISTING ADDRESS CAN'T BE GUARANTEED FOR THE I/O PAGE
5080                                    ;*
5081                                    ;**************************************************************
5082  034354                            TST45:
5083  034354  000004                           SCOPE
5084  034356  012737  035252  001444           MOV     #TST46,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
5085                                                                    ;TEST FOR ESCAPE ON PARITY ERRORS
5086                                    ;       THE FOLLOWING  CODE IS USED TO INITIALIZE THE PAR'S FOR
5087                                    ;       THE NEXT TESTS, SO THAT THE CODE WILL RUN WITH MEMORY
5088                                    ;       MANAGEMENT FULLY ENABLED.
5089                                    ;
5090  034364  012737  000000  172340           MOV     #0,KIPAR0       ;
5091  034372  012737  000200  172342           MOV     #200,KIPAR1     ;
5092  034400  012737  000400  172344           MOV     #400,KIPAR2     ;
5093  034406  012737  000600  172346           MOV     #600,KIPAR3     ;
5094  034414  012737  000600  172350           MOV     #600,KIPAR4     ;
5095  034422  012737  000600  172352           MOV     #600,KIPAR5     ;
5096  034430  012737  000600  172354           MOV     #600,KIPAR6     ;
5097  034436  012737  007600  172356           MOV     #7600,KIPAR7    ;
5098  034444  012737  000000  177640           MOV     #0,UIPAR0       ;
5099  034452  012737  000200  177642           MOV     #200,UIPAR1     ;
5100  034460  012737  000400  177644           MOV     #400,UIPAR2     ;
5101  034466  012737  000600  177646           MOV     #600,UIPAR3     ;
5102  034474  012737  000600  177650           MOV     #600,UIPAR4     ;
5103  034502  012737  000600  177652           MOV     #600,UIPAR5     ;
5104  034510  012737  000600  177654           MOV     #600,UIPAR6     ;
5105  034516  012737  007600  177656           MOV     #7600,UIPAR7    ;
5106  034524  012737  034534  001110           MOV     #20$,$LPERR     ;SET LOOP ON ERROR POINTER TO 20$
5107  034532  104410                           TBITO                   ;MAKE SURE THAT T-BIT IS OFF FOR
5108                                                                    ;THE DUAL MAPPING TESTS
5109  034534  012737  034624  001110  20$:     MOV     #21$,$LPERR     ;SET LOOP ON ERROR POINTER TO 21$
5110  034542  012737  000000  177776           MOV     #00000,PSW      ;GO TO KERNEL MODE
5111  034550  012703  172300                   MOV     #KIPDR0,R3      ;LOAD FIRST ADDRESS OF KERNEL PDR'S
5112                                                                    ;THAT WILL BE TESTED IN THIS TEST
5113  034554  012704  000010                   MOV     #10,R4          ;TEST THE NEXT EIGHT PDR'S
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5114  034560  012705  010200          MOV     #10200,R5       ;LOAD STARTING VIRTUAL ADDRESS INTO R5
5115  034564  012700  077406  19$:    MOV     #77406,R0       ;ALL PAGES WILL BE ACF=6
5116  034570  005037  001176          CLR     $TMP0           ;CLEAR CORRECT PDR SET INDICATOR
5117  034574  012702  000010          MOV     #10,R2          ;SET COUNT TO LOAD 8 ADDRESSES
5118  034600  012701  172300          MOV     #KIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
5119  034604  010021          1$:     MOV     R0,(R1)+        ;LOAD R0 INTO PDR ADDRESSED BY R1
5120  034606  077202                  SOB     R2,1$           ;BRANCH BACK TO 1$ IF R2 IS NOT ZERO
5121  034610  012702  000010          MOV     #10,R2          ;SET COUNT TO LOAD 8 ADDRESSES
5122  034614  012701  177600          MOV     #UIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
5123  034620  010021          2$:     MOV     R0,(R1)+        ;LOAD R0 INTO PDR ADDRESSED BY R1
5124  034622  077202                  SOB     R2,2$           ;BRANCH BACK TO 2$ IF R2 IS NOT ZERO
5125  034624  012700  077406  21$:    MOV     #77406,R0       ;MUST RE-INIT THESE PDRS IF ERROR
5126  034630  010037  172300          MOV     R0,KIPDR0       ;LOAD KERNEL PDR0
5127  034634  010037  172302          MOV     R0,KIPDR1       ;LOAD KERNEL PDR1
5128  034640  010037  172304          MOV     R0,KIPDR2       ;LOAD KERNEL PDR2
5129  034644  010037  172316          MOV     R0,KIPDR7       ;LOAD KERNEL PDR7
5130  034650  010037  172300          MOV     R0,KIPDR0               ;LOAD PDR0 OF PRESENT SPACE
5131  034654  010037  172316          MOV     R0,KIPDR7               ;LOAD PDR7 OF PRESENT SPACE
5132  034660  020527  170200          CMP     R5,#170200      ;IS PDR7 BEING TESTED?
5133  034664  001032                  BNE     22$             ;BRANCH IF IT ISN'T
5134  034666  012737  007600  172354  MOV     #7600,KIPAR6    ;MAP PAR6 TO THE I/O PAGE
5135  034674  012737  000600  172356  MOV     #600,KIPAR7     ;RE-MAP PAR7 TO 12K
5136  034702  011515                  MOV     (R5),(R5)       ;NOW WRITE USING PAR7
5137  034704  042737  000001  157572  BIC     #BIT0,@#157572  ;TURN OFF MEMORY MANAGMENT USING
5138                                                          ;PAR6-ADDRESS OF MMR0
5139  034712  022737  077506  172316  CMP     #77506,KIPDR7   ;CHECK PDR 7 BEFORE RESTORING PDR/PAR'S
5140  034720  001005                  BNE     24$             ;DID W-BIT GET SET?
5141                                                          ;BRANCH IF NO
5142  034722  005237  001176          INC     $TMP0           ;SET CORRECT PDR SET INDICATOR
5143  034726  012737  077406  172300  MOV     #77406,KIPDR0   ;RESTORE PDR0 AFTER WRITING $TMP0
5144  034734  012737  077406  172314  24$:    MOV     #77406,KIPDR6   ;RESET PDR6
5145  034742  012737  000600  172354          MOV     #600,KIPAR6     ;RE-MAP PAR6 TO 12K
5146  034750  000401                  BR      23$             ;AND NOW COMPARE TO OTHER PDR'S
5147  034752  011515          22$:    MOV     (R5),(R5)       ;WRITE INTO PAGE UNDER TEST
5148  034754          23$:
5149  034754  012702  000010          MOV     #10,R2          ;SET COUNTER TO READ NEXT 10 REGISTERS
5150  034760  012701  172300          MOV     #KIPDR0,R1      ;LOAD ADDRESS OF BEGINNING PDR
5151  034764  011100          7$:     MOV     (R1),R0         ;READ PDR INTO R0
5152  034766  022700  077506          CMP     #77506,R0       ;SEE IF THIS WAS THE PDR WITH ITS W BIT ON
5153  034772  001030                  BNE     9$              ;BRANCH IF THIS IS NOT THE ONE
5154  034774  020103                  CMP     R1,R3           ;SEE IF THE ADDRESS MATCHES PDR UNDER TEST
5155  034776  001424                  BEQ     8$              ;BRANCH IF ADDRESS IS CORRECT
5156  035000  104062                  ERROR   62              ;W BIT GOT SET IN WRONG PDR
5157  035002  012700  077406          MOV     #77406,R0       ;RE-SET PAGES MODIFIED BY ERROR
5158  035006  010037  172300          MOV     R0,KIPDR0       ;RELOAD KERNEL PDR0
5159  035012  010037  172302          MOV     R0,KIPDR1       ;RELOAD KERNEL PDR1
5160  035016  010037  172304          MOV     R0,KIPDR2       ;RELOAD KERNEL PDR2
5161  035022  010037  172316          MOV     R0,KIPDR7       ;RELOAD KERNEL PDR7
5162  035026  010037  172300          MOV     R0,KIPDR0               ;RELOAD PAGE 0 OF PRESENT SPACE
5163  035032  010037  172316          MOV     R0,KIPDR7               ;RE-LOAD I/O PAGE PDR IF ERROR
5164  035036  020527  170200          CMP     R5,#170200      ;SEE IF TESTING PDR7
5165  035042  001404                  BEQ     9$              ;DON'T WRITE IF TESTING PDR7
5166  035044  011515                  MOV     (R5),(R5)       ;TRY WRITE AGAIN, IN CASE YOU
5167                                                          ;WERE NOT TESTING PAGE SEVEN
5168  035046  000402                  BR      9$              ;GO UPDATE R1 FOR NEXT READ
5169  035050  005237  001176  8$:     INC     $TMP0           ;SET FLAG SINCE ADDRESSES MATCHED
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5170  035054  062701  000002          9$:     ADD     #2,R1           ;POINT TO NEXT PDR TO BE READ
5171  035060  077237                          SOB     R2,7$           ;BRANCH TO 7$ IF ALL PDR'S NOT READ
5172  035062  012702  000010                  MOV     #10,R2          ;SET COUNTER TO READ NEXT 10 REGISTERS
5173  035066  012701  177600                  MOV     #UIPDR0,R1      ;LOAD ADDRESS OF BEGINNING PDR
5174  035072  011100                  13$:    MOV     (R1),R0         ;READ PDR INTO R0
5175  035074  022700  077506                  CMP     #77506,R0       ;SEE IF THIS WAS THE PDR WITH ITS W BIT ON
5176  035100  001030                          BNE     15$             ;BRANCH IF THIS IS NOT THE ONE
5177  035102  020103                          CMP     R1,R3           ;SEE IF THE ADDRESS MATCHES PDR UNDER TEST
5178  035104  001424                          BEQ     14$             ;BRANCH IF ADDRESS IS CORRECT
5179  035106  104062                          ERROR   62              ;W BIT GOT SET IN WRONG PDR
5180  035110  012700  077406                  MOV     #77406,R0       ;RE-SET PAGES MODIFIED BY ERROR
5181  035114  010037  172300                  MOV     R0,KIPDR0       ;RELOAD KERNEL PDR0
5182  035120  010037  172302                  MOV     R0,KIPDR1       ;RELOAD KERNEL PDR1
5183  035124  010037  172304                  MOV     R0,KIPDR2       ;RELOAD KERNEL PDR2
5184  035130  010037  172316                  MOV     R0,KIPDR7       ;RELOAD KERNEL PDR7
5185  035134  010037  172300                  MOV     R0,KIPDR0               ;RELOAD PAGE 0 OF PRESENT SPACE
5186  035140  010037  172316                  MOV     R0,KIPDR7               ;RE-LOAD I/O PAGE PDR IF ERROR
5187  035144  020527  170200                  CMP     R5,#170200      ;SEE IF TESTING PDR7
5188  035150  001404                          BEQ     15$             ;DON'T WRITE IF TESTING PDR7
5189  035152  011515                          MOV     (R5),(R5)       ;TRY WRITE AGAIN, IN CASE YOU
5190                                                                  ;WERE NOT TESTING PAGE SEVEN
5191  035154  000402                          BR      15$             ;GO UPDATE R1 FOR NEXT READ
5192  035156  005237  001176          14$:    INC     $TMP0           ;SET FLAG SINCE ADDRESSES MATCHED
5193  035162  062701  000002          15$:    ADD     #2,R1           ;POINT TO NEXT PDR TO BE READ
5194  035166  077237                          SOB     R2,13$          ;BRANCH TO 13$ IF ALL PDR'S NOT READ
5195  035170  005737  001176                  TST     $TMP0           ;SEE IF THERE WAS A CORRECT PDR
5196  035174  001002                          BNE     16$             ;BRANCH IF THERE WAS
5197  035176  011300                          MOV     (R3),R0         ;SAVE CONTENTS OF PDR UNDER TEST
5198  035200  104063                          ERROR   63              ;NO PDR ADDRESSES MATCHED
5199  035202  062703  000002          16$:    ADD     #2,R3           ;POINT TO NEXT PDR UNDER TEST
5200  035206  062705  020000                  ADD     #20000,R5       ;CHANGE PAGE NUMBER IN VIRT. ADDR.
5201  035212  005304                          DEC     R4              ;DECREMENT COUNTER
5202  035214  001402                          BEQ     17$             ;BRANCH IF COUNTER IS ZERO
5203  035216  000137  034564                  JMP     19$             ;JUMP TO LOAD PDR'S AGAIN
5204  035222  012737  007600  172356  17$:    MOV     #7600,KIPAR7    ;REMAP PAR7 TO THE I/O PAGE
5205  035230  052737  000001  177572          BIS     #BIT0,MMR0      ;REENABLE MEMORY MANAGEMENT AFTER
5206                                                                  ;TESTING PDR7
5207  035236  012737  000340  177776          MOV     #340,PSW        ;RETURN TO KERNEL MODE, PRIORITY 7
5208  035244  012737  034534  001110          MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
5209
5210
5211
5212
5213                                  ;*****************************************************************
5214                                  ;*TEST 46        DUAL MAPPING USER MODE SPACE
5215                                  ;*
5216                                  ;*      THIS TEST STARTS BY LOADING ALL THE P.D.R.'S WITH 77406
5217                                  ;*      (4K PAGE,READ/WRITE).  THEN THE VIRTUAL ADDRESS IS SET TO
5218                                  ;*      010200 AND THAT WORD IS WRITTEN INTO ITSELF.  THIS WRITE WILL
5219                                  ;*      SET THE W BIT IN THE USER SPACE P.D.R. UNDER TEST.  NOW ALL OF THE
5220                                  ;*      P.D.R.'S ARE COMPARED WITH 77706 AND ANY THAT MATCH, EXCEPT THE
5221                                  ;*      ONE THAT IS UNDER TEST, ARE REPORTED AS DUAL MAPPING ERRORS.
5222                                  ;*      USER PAR7 IS MAPPED TO 12K AND USER PAR6 TO I/O PAGE DURING THE WRITE SINCE
5223                                  ;*      WRITING TO REGISTERS INTERNAL TO THE CPU ON THE 11/6X WILL NOT SET THE W BIT
5224                                  ;*      AND ANY OTHER EXSISTING ADDRESS CAN'T BE GUARANTEED FOR THE I/O PAGE
5225                                  ;*
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5226                                    ;;*****************************************************************
5227  035252                            ;TST46:
5228  035252  000004                            SCOPE
5229  035254  012737  036000  001444            MOV     #TST47,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
5230                                            ;TEST FOR ESCAPE ON PARITY ERRORS
5231  035262  012737  035352  001110  20$:       MOV     #21$,$LPERR     ;SET LOOP ON ERROR POINTER TO 21$
5232  035270  012737  140000  177776            MOV     #140000,PSW     ;GO TO USER MODE
5233  035276  012703  177600                    MOV     #UIPDR0,R3      ;LOAD FIRST ADDRESS OF USER PDR'S
5234                                            ;THAT WILL BE TESTED IN THIS TEST
5235  035302  012704  000010                    MOV     #10,R4          ;TEST THE NEXT EIGHT PDR'S
5236  035306  012705  010200                    MOV     #10200,R5       ;LOAD STARTING VIRTUAL ADDRESS INTO R5
5237  035312  012700  077406          19$:      MOV     #77406,R0       ;ALL PAGES WILL BE ACF=6
5238  035316  005037  001176                    CLR     $TMP0           ;CLEAR CORRECT PDR SET INDICATOR
5239  035322  012702  000010                    MOV     #10,R2          ;SET COUNT TO LOAD 8 ADDRESSES
5240  035326  012701  172300                    MOV     #KIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
5241  035332  010021                  1$:       MOV     R0,(R1)+        ;LOAD R0 INTO PDR ADDRESSED BY R1
5242  035334  077202                            SOB     R2,1$           ;BRANCH BACK TO 1$ IF R2 IS NOT ZERO
5243  035336  012702  000010                    MOV     #10,R2          ;SET COUNT TO LOAD 8 ADDRESSES
5244  035342  012701  177600                    MOV     #UIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
5245  035346  010021                  2$:       MOV     R0,(R1)+        ;LOAD R0 INTO PDR ADDRESSED BY R1
5246  035350  077202                            SOB     R2,2$           ;BRANCH BACK TO 2$ IF R2 IS NOT ZERO
5247  035352  012700  077406          21$:      MOV     #77406,R0       ;MUST RE-INIT THESE PDRS IF ERROR
5248  035356  010037  172300                    MOV     R0,KIPDR0       ;LOAD KERNEL PDR0
5249  035362  010037  172302                    MOV     R0,KIPDR1       ;LOAD KERNEL PDR1
5250  035366  010037  172304                    MOV     R0,KIPDR2       ;LOAD KERNEL PDR2
5251  035372  010037  172316                    MOV     R0,KIPDR7       ;LOAD KERNEL PDR7
5252  035376  010037  177600                    MOV     R0,UIPDR0               ;LOAD PDR0 OF PRESENT SPACE
5253  035402  010037  177616                    MOV     R0,UIPDR7               ;LOAD PDR7 OF PRESENT SPACE
5254  035406  020527  170200                    CMP     R5,#170200      ;IS PDR7 BEING TESTED?
5255  035412  001032                            BNE     22$             ;BRANCH IF IT ISN'T
5256  035414  012737  007600  177654            MOV     #7600,UIPAR6    ;MAP PAR6 TO THE I/O PAGE
5257  035422  012737  000600  177656            MOV     #600,UIPAR7     ;RE-MAP PAR7 TO 12K
5258  035430  011515                            MOV     (R5),(R5)       ;NOW WRITE USING PAR7
5259  035432  042737  000001  157572            BIC     #BIT0,@#157572  ;TURN OFF MEMORY MANAGMENT USING
5260                                            ;PAR6-ADDRESS OF MMR0
5261  035440  022737  077506  177616            CMP     #77506,UIPDR7   ;CHECK PDR 7 BEFORE RESTORING PDR/PAR'S
5262  035446  001005                            BNE     24$             ;DID W-BIT GET SET?
5263                                            ;BRANCH IF NO
5264  035450  005237  001176                    INC     $TMP0           ;SET CORRECT PDR SET INDICATOR
5265  035454  012737  077406  177600            MOV     #77406,UIPDR0   ;RESTORE PDP0 AFTER WRITING $TMP0
5266  035462  012737  077406  177614  24$:      MOV     #77406,UIPDR6   ;RESET PDR6
5267  035470  012737  000600  177654            MOV     #600,UIPAR6     ;RE-MAP PAR6 TO 12K
5268  035476  000401                            BR      23$             ;AND NOW COMPARE TO OTHER PDR'S
5269  035500  011515                  22$:      MOV     (R5),(R5)       ;WRITE INTO PAGE UNDER TEST
5270  035502                            23$:
5271  035502  012702  000010                    MOV     #10,R2          ;SET COUNTER TO READ NEXT 10 REGISTERS
5272  035506  012701  172300                    MOV     #KIPDR0,R1      ;LOAD ADDRESS OF BEGINNING PDR
5273  035512  011100                  7$:       MOV     (R1),R0         ;READ PDR INTO R0
5274  035514  022700  077506                    CMP     #77506,R0       ;SEE IF THIS WAS THE PDR WITH ITS W BIT ON
5275  035520  001030                            BNE     9$              ;BRANCH IF THIS IS NOT THE ONE
5276  035522  020103                            CMP     R1,R3           ;SEE IF THE ADDRESS MATCHES PDR UNDER TEST
5277  035524  001424                            BEQ     8$              ;BRANCH IF ADDRESS IS CORRECT
5278  035526  104062                            ERROR   62              ;W BIT GOT SET IN WRONG PDR
5279  035530  012700  077406                    MOV     #77406,R0       ;RE-SET PAGES MODIFIED BY ERROR
5280  035534  010037  172300                    MOV     R0,KIPDR0       ;RELOAD KERNEL PDR0
5281  035540  010037  172302                    MOV     R0,KIPDR1       ;RELOAD KERNEL PDR1
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5282  035544  010037  172304              MOV     R0,KIPDR2       ;RELOAD KERNEL PDR2
5283  035550  010037  172316              MOV     R0,KIPDR7       ;RELOAD KERNEL PDR7
5284  035554  010037  177600              MOV     R0,UIPDR0               ;RELOAD PAGE 0 OF PRESENT SPACE
5285  035560  010037  177616              MOV     R0,UIPDR7               ;RE-LOAD I/O PAGE PDR IF ERROR
5286  035564  020527  170200              CMP     R5,#170200      ;SEE IF TESTING PDR7
5287  035570  001404                      BEQ     9$              ;DON'T WRITE IF TESTING PDR7
5288  035572  011515                      MOV     (R5),(R5)       ;TRY WRITE AGAIN, IN CASE YOU
5289                                                              ;WERE NOT TESTING PAGE SEVEN
5290  035574  000402                      BR      9$              ;GO UPDATE R1 FOR NEXT READ
5291  035576  005237  001176      8$:     INC     $TMP0           ;SET FLAG SINCE ADDRESSES MATCHED
5292  035602  062701  000002      9$:     ADD     #2,R1           ;POINT TO NEXT PDR TO BE READ
5293  035606  077237                      SOB     R2,7$           ;BRANCH TO 7$ IF ALL PDR'S NOT READ
5294  035610  012702  000010              MOV     #10,R2          ;SET COUNTER TO READ NEXT 10 REGISTERS
5295  035614  012701  177600              MOV     #UIPDR0,R1      ;LOAD ADDRESS OF BEGINNING PDR
5296  035620  011100              13$:    MOV     (R1),R0         ;READ PDR INTO R0
5297  035622  022700  077506              CMP     #77506,R0       ;SEE IF THIS WAS THE PDR WITH ITS W BIT ON
5298  035626  001030                      BNE     15$             ;BRANCH IF THIS IS NOT THE ONE
5299  035630  020103                      CMP     R1,R3           ;SEE IF THE ADDRESS MATCHES PDR UNDER TEST
5300  035632  001424                      BEQ     14$             ;BRANCH IF ADDRESS IS CORRECT
5301  035634  104062                      ERROR   62              ;W BIT GOT SET IN WRONG PDR
5302  035636  012700  077406              MOV     #77406,R0       ;RE-SET PAGES MODIFIED BY ERROR
5303  035642  010037  172300              MOV     R0,KIPDR0       ;RELOAD KERNEL PDR0
5304  035646  010037  172302              MOV     R0,KIPDR1       ;RELOAD KERNEL PDR1
5305  035652  010037  172304              MOV     R0,KIPDR2       ;RELOAD KERNEL PDR2
5306  035656  010037  172316              MOV     R0,KIPDR7       ;RELOAD KERNEL PDR7
5307  035662  010037  177600              MOV     R0,UIPDR0               ;RELOAD PAGE 0 OF PRESENT SPACE
5308  035666  010037  177616              MOV     R0,UIPDR7               ;RE-LOAD I/O PAGE PDR IF ERROR
5309  035672  020527  170200              CMP     R5,#170200      ;SEE IF TESTING PDR7
5310  035676  001404                      BEQ     15$             ;DON'T WRITE IF TESTING PDR7
5311  035700  011515                      MOV     (R5),(R5)       ;TRY WRITE AGAIN, IN CASE YOU
5312                                                              ;WERE NOT TESTING PAGE SEVEN
5313  035702  000402                      BR      15$             ;GO UPDATE R1 FOR NEXT READ
5314  035704  005237  001176      14$:    INC     $TMP0           ;SET FLAG SINCE ADDRESSES MATCHED
5315  035710  062701  000002      15$:    ADD     #2,R1           ;POINT TO NEXT PDR TO BE READ
5316  035714  077237                      SOB     R2,13$          ;BRANCH TO 13$ IF ALL PDR'S NOT READ
5317  035716  005737  001176              TST     $TMP0           ;SEE IF THERE WAS A CORRECT PDR
5318  035722  001002                      BNE     16$             ;BRANCH IF THERE WAS
5319  035724  011300                      MOV     (R3),R0         ;SAVE CONTENTS OF PDR UNDER TEST
5320  035726  104063                      ERROR   63              ;NO PDR ADDRESSES MATCHED
5321  035730  062703  000002      16$:    ADD     #2,R3           ;POINT TO NEXT PDR UNDER TEST
5322  035734  062705  020000              ADD     #20000,R5       ;CHANGE PAGE NUMBER IN VIRT. ADDR.
5323  035740  005304                      DEC     R4              ;DECREMENT COUNTER
5324  035742  001402                      BEQ     17$             ;BRANCH IF COUNTER IS ZERO
5325  035744  000137  035312              JMP     19$             ;JUMP TO LOAD PDR'S AGAIN
5326  035750  012737  007600  177656  17$:     MOV     #7600,UIPAR7    ;REMAP PAR7 TO THE I/O PAGE
5327  035756  052737  000001  177572              BIS     #BIT0,MMR0      ;REENABLE MEMORY MANAGEMENT AFTER
5328                                                              ;TESTING PDR7
5329  035764  012737  000340  177776              MOV     #340,PSW        ;RETURN TO KERNEL MODE, PRIORITY 7
5330  035772  012737  035262  001110              MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
5331
5332
5333
5334
5335                                  .SBTTL  ************ ENTRY POINT 7 --- STARTING ADDRESS 230 ************
5336                                  .SBTTL  ***** MOVE FROM AND MOVE TO PREVIOUS MODE INSTRUCTION TEST *****
5337                                  ;*
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                                ;*      THIS GROUP OF TESTS WILL TEST ALL THE LOGIC ASSOCIATED WITH
                                ;*      THE "MOVE FROM PREVIOUS" AND MOVE TO PREVIOUS" INSTRUCTIONS.
                                ;*


                                ;;*****************************************************************
                                ;*TEST 47       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 IS NOT ENABLED A NON-RESIDENT ABORT
                                ;*      WILL OCCUR AND TRAP TO 10$, WHERE THE ERRORS ARE REPORTED.
                                ;*
                                ;;*****************************************************************
036000                          ;ST47:
                                        SCOPE
036000  000004
036002  012737  036742  001444          MOV     #TST50,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
                                                                ;TEST FOR ESCAPE ON PARITY ERRORS
036010  104411                        TBITR                   ;RESTORE T-BIT IF IT WAS ON BEFORE
                                                                ;THE DUAL MAPPING TESTS
036012  012737  036244  001106  ENTPT7: MOV     #20$,$LPADR     ;SET LOOP ADDRESS POINTER TO 20$
036020  012737  036244  001110          MOV     #20$,$LPERR     ;SET LOOP ON ERROR POINTER TO 20$
036026  012737  000047  001102          MOV     #47,$TSTNM      ;LOAD TEST NUMBER INTO MEMORY
036034  013777  001102  143100          MOV     $TSTNM,@DISPLAY ;DISPLAY TEST NUMBER FOR THIS TEST
036042  012737  077406  172300          MOV     #77406,KIPDR0   ;MAKE KERNEL I PAGE 0 200 BLOCKS, R/W
036050  012737  077406  172302          MOV     #77406,KIPDR1   ;MAKE KERNEL I PAGE 1 200 BLOCKS, R/W
036056  012737  077406  172304          MOV     #77406,KIPDR2   ;MAKE KERNEL I PAGE 2 200 BLOCKS, R/W
036064  012737  077406  172306          MOV     #77406,KIPDR3   ;MAKE KERNEL I PAGE 3 200 BLOCKS, R/W
036072  012737  077406  172316          MOV     #77406,KIPDR7   ;MAKE KERNEL I PAGE 7 200 BLOCKS, R/W
036100  012737  000000  172340          MOV     #000,KIPAR0     ;MAP KERNEL I PAGE 0 TO 0 - 4K
036106  012737  000200  172342          MOV     #200,KIPAR1     ;MAP KERNEL I PAGE 1 TO 4K - 8K
036114  012737  000400  172344          MOV     #400,KIPAR2     ;MAP KERNEL I PAGE 2 TO 9K - 12K
036122  012737  000600  172346          MOV     #600,KIPAR3     ;MAP KERNEL I PAGE 3 TO 12K - 16K
036130  012737  007600  172356          MOV     #7600,KIPAR7    ;MAP KERNEL I PACE 7 TO THE I/O PAGE
036136  012737  000001  177572          MOV     #BIT0,MMR0      ;ENABLE 18-BIT RELOCATION IF NOT ON
036144  012700  077406                  MOV     #77406,R0       ;MAKE ALL KERNEL I-SPACE PAGES RESIDENT
                                                                ;READ/WRITE, LENGTH 200 BLOCKS
036150  012702  000010                  MOV     #10,R2          ;SET COUNT TO LOAD 8 ADDRESSES
036154  012701  172300                  MOV     #KIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
036160  010021                  19$:    MOV     R0,(R1)+        ;LOAD R0 INTO PDR ADDRESSED BY R1
036162  077202                          SOB     R2,19$          ;BRANCH BACK TO 19$ IF R2 IS NOT ZERO
036164  012702  000010                  MOV     #10,R2          ;SET COUNT TO LOAD 8 ADDRESSES
036170  012701  177600                  MOV     #UIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
036174  010021                  30$:    MOV     R0,(R1)+        ;LOAD R0 INTO PDR ADDRESSED BY R1
036176  077202                          SOB     R2,30$          ;BRANCH BACK TO 30$ IF R2 IS NOT ZERO
036200  012737  000000  177640          MOV     #000,UIPAR0     ;MAP USER I PAGE 0 TO 0-4K
036206  012737  000200  177642          MOV     #200,UIPAR1     ;MAP USER I PAGE 1 TO 4-8K
036214  012737  000400  177644          MOV     #400,UIPAR2     ;MAP USER I PAGE 2 TO 8-12K
036222  012737  000600  177646          MOV     #600,UIPAR3     ;MAP USER I PAGE 3 TO 12-16K
036230  012737  007600  177656          MOV     #7600,UIPAR7    ;MAP USER I PAGE 7 TO THE I/O PAGE
036236  012737  036244  001110          MOV     #20$,$LPERR     ;SET LOOP ON ERROR TO 20$
036244                          20$:
036244  012737  077406  172310          MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
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5394  036252  012737  000600  172350          MOV     #600,KIPAR4     ;MAP KERNEL I PAGE 4 TO 12K
5395  036260  012737  000600  177650          MOV     #600,UIPAR4     ;MAP USER I PAGE 4 TO 12K
5396  036266  012700  036514                  MOV     #36514,R0       ;LOAD DATA PATTERN INTO R0
5397  036272  010037  100000                  MOV     R0,@#100000     ;LOAD DATA PATTERN INTO PHY 60000
5398  036276  012737  036674  000250          MOV     #10$,MMVEC      ;SET M.M. VECTOR TO 10$
5399  036304  105037  172310                  CLRB    KIPDR4          ;MAKE KERNEL I-SPACE PAGE 4 NON-RESIDENT
5400                                          ;THE FOLLOWING WILL TEST DSTM=0 MFPI
5401                                          ;
5402  036310  012737  036316  001110          MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
5403  036316  012737  030340  177776  11$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
5404  036324  006506                  1$:     MFPI    USP             ;PUT USER STACK POINTER ON KERNEL
5405                                                                  ;STACK
5406  036326  022706  001100                  CMP     #KERSTK,KSP     ;WAS SOMETHING PUSHED ON STACK AT 1$
5407  036332  001407                          BEQ     3$              ;BRANCH IF NOTHING WAS PUSHED
5408  036334  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
5409  036336  012702  000700                  MOV     #USESTK,R2      ;EXPECTING TO GET 700 AS USP
5410  036342  020201                          CMP     R2,R1           ;DID YOU GET THE RIGHT POINTER?
5411  036344  001403                          BEQ     2$              ;BRANCH IF YOU DID
5412  036346  104064                          ERROR   64              ;WRONG THING WAS PUSHED ON STACK
5413  036350  000401                          BR      2$              ;BRANCH TO NEXT TRY
5414  036352  104065                  3$:     ERROR   65              ;NOTHING PUSHED ON STACK
5415  036354                          2$:     ;THE FOLLOWING WILL TEST DSTM=1 MFPI.
5416  036354  012737  036362  001110          MOV     #12$,$LPERR     ;SET LOOP ON ERROR POINTER TO 12$
5417  036362  012737  030340  177776  12$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
5418  036370  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
5419  036374  006512                          MFPI    (R2)            ;READ FROM PHYSICAL 60000
5420  036376  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
5421  036400  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
5422  036402  001401                          BEQ     4$              ;BRANCH IF CORRECT DATA WAS FETCHED
5423  036404  104066                          ERROR   66              ;WRONG DATA WAS FETCHED
5424  036406                          4$:     ;THE FOLLOWING WILL TEST DSTM=2 MFPI.
5425  036406  012737  036414  001110          MOV     #14$,$LPERR     ;SET LOOP ON ERROR POINTER TO 14$
5426  036414  012737  030340  177776  14$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
5427  036422  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
5428  036426  006522                          MFPI    (R2)+           ;READ FROM PHYSICAL 60000
5429  036430  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
5430  036432  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
5431  036434  001401                          BEQ     5$              ;BRANCH IF CORRECT DATA WAS FETCHED
5432  036436  104066                          ERROR   66              ;WRONG DATA WAS FETCHED
5433  036440                          5$:     ;THE FOLLOWING WILL TEST DSTM=3 MFPI.
5434  036440  012737  036446  001110          MOV     #15$,$LPERR     ;SET LOOP ON ERROR POINTER TO 15$
5435  036446  012737  030340  177776  15$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
5436  036454  006537  100000                  MFPI    @#100000        ;READ FROM PHYSICAL 60000
5437  036460  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
5438  036462  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
5439  036464  001401                          BEQ     6$              ;BRANCH IF CORRECT DATA WAS FETCHED
5440  036466  104066                          ERROR   66              ;WRONG DATA WAS FETCHED
5441  036470                          6$:     ;THE FOLLOWING WILL TEST DSTM=4 MFPI.
5442  036470  012737  036476  001110          MOV     #16$,$LPERR     ;SET LOOP ON ERROR POINTER TO 16$
5443  036476  012737  030340  177776  16$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
5444  036504  012702  100002                  MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
5445  036510  006542                          MFPI    -(R2)           ;READ FROM PHYSICAL 60000
5446  036512  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
5447  036514  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
5448  036516  001401                          BEQ     7$              ;BRANCH IF CORRECT DATA WAS FETCHED
5449  036520  104066                          ERROR   66              ;WRONG DATA WAS FETCHED
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5450  036522                                  7$:
5451                                                ;THE FOLLOWING WILL TEST DSTM=5 MFPI.
5452                                                ;
5453  036522  012737  036530  001110                MOV     #17$,$LPERR     ;SET LOOP ON ERROR POINTER TO 17$
5454  036530  012737  030340  177776  17$:          MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
5455  036536  012737  100000  001202                MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR INTO LOC. $TMP2
5456  036544  012702  001204                      MOV     #<$TMP2+2>,R2   ;LOAD ADDR. OF $TMP2+2 INTO R2
5457  036550  006552                              MFPI    @-(R2)          ;READ FROM PHYSICAL 60000
5458  036552  012601                              MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
5459  036554  020001                              CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
5460  036556  001401                              BEQ     8$              ;BRANCH IF CORRECT DATA WAS FETCHED
5461  036560  104066                              ERROR   66              ;WRONG DATA WAS FETCHED
5462  036562                                  8$:     ;THE FOLLOWING WILL TEST DSTM=6 MFPI.
5463                                                ;
5464  036562  012737  036570  001110                MOV     #18$,$LPERR     ;SET LOOP ON ERROR POINTER TO 18$
5465  036570  012737  030340  177776  18$:          MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
5466  036576  005002                              CLR     R2              ;MAKE REGISTER 2 A ZERO
5467  036600  006562  100000                      MFPI    100000(R2)      ;READ FROM PHYSICAL 60000
5468  036604  012601                              MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
5469  036606  020001                              CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
5470  036610  001401                              BEQ     9$              ;BRANCH IF CORRECT DATA WAS FETCHED
5471  036612  104066                              ERROR   66              ;WRONG DATA WAS FETCHED
5472  036614                                  9$:     ;THE FOLLOWING WILL TEST DSTM=7 MFPI.
5473                                                ;
5474  036614  012737  036622  001110                MOV     #22$,$LPERR     ;SET LOOP ON ERROR POINTER TO 22$
5475  036622  012737  030340  177776  22$:          MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
5476  036630  012737  100000  001202                MOV     #100000,$TMP2   ;LOAD TEST LOC. V.A. INTO $TMP2
5477  036636  012702  001202                      MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
5478  036642  006572  000000                      MFPI    @0(R2)          ;USE $TMP2 TO FETCH VIRTUAL
5479                                                ;ADDRESS OF 60000
5480  036646  012601                              MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
5481  036650  020001                              CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
5482  036652  001401                              BEQ     25$             ;BRANCH IF CORRECT DATA WAS FETCHED
5483  036654  104066                              ERROR   66              ;WRONG DATA WAS FETCHED
5484  036656  012737  015430  000250  25$:          MOV     #MMTRAP,MMVEC   ;SET M.M. VECTOR TO NORMAL ROUTINE
5485  036664  012737  036244  001110                MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
5486  036672  000423                              BR      TST50           ;;BRANCH TO NEXT TEST
5487
5488
5489  036674  012637  001434          10$:        MOV     (KSP)+,OLDPC    ;SAVE PC & PS OF TRAP
5490  036700  012637  001436                      MOV     (KSP)+,OLDPS
5491  036704  013737  177572  001 )2             MOV     MMR0,PMMR0      ;SAVE MMR0 FOR ERROR TYPEOUT
5492  036712  013737  177576  001 )4             MOV     MMR2,PMMR2      ;SAVE MMR2 FOR ERROR TYPEOUT
5493  036720  042737  160000  177 ?2             BIC     #160000,MMR0    ;CLEAR ERROR BITS IN MMR0
5494  036726  104067                              ERROR   67              ;TRIED TO READ NON-RESIDENT PAGE
5495  036730  013746  001436                      MOV     OLDPS,-(KSP)    ;PUT PC & PS OF TRAP ON STACK
5496  036734  013746  001434                      MOV     OLDPC,-(KSP)
5497  036740  000002                              RTI
5498
5499
5500                                            ;;**********************************************************************
5501                                            ;*TEST 50        MOVE TO PREVIOUS (USER) I-SPACE
5502                                            ;*
5503                                            ;*      THIS TEST USES THE 'MTPI' INSTRUCTION TO ENSURE THAT THE
5504                                            ;*      PREVIOUS MODE IS CLOCKED CORRECTLY
5505                                            ;*      THERE IS A DESCRIPTION BEFORE EACH DESTINATION MODE TESTED.
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                                        ;*
                                        ;*
                                        ;*      IF THE CORRECT MODE IS NOT ENABLED A NON-RESIDENT ABORT
                                        ;*      WILL OCCUR AND TRAP TO 10$, WHERE THE ERRORS ARE REPORTED.
                                        ;*
                                        ;**************************************************************
036742                                  TST50:
036742  000004                                  SCOPE
036744  012737  037630  001444                 MOV     #TST51,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
                                                                        ;TEST FOR ESCAPE ON PARITY ERRORS
036752  012737  077406  172310  20$:     MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
036760  012737  077406  177610          MOV     #77406,UIPDR4   ;USER I-SPACE PAGE 4 READ/WRITE
036766  012737  000600  172350          MOV     #600,KIPAR4     ;MAP KERNEL I PAGE 4 TO 12K
036774  012737  000600  177650          MOV     #600,UIPAR4     ;MAP USER I PAGE 4 TO 12K
037002  012737  037562  000250          MOV     #10$,MMVEC      ;SET M.M. VECTOR TO 10$
                                        ;THE FOLLOWING WILL TEST DSTM=0 MTPI
                                        ;
037010  012737  030340  177776  1$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
037016  012746  007777                  MOV     #7777,-(KSP)    ;PUSH DATA ON KERNEL STACK
037022  006606                          MTPI    USP             ;LOAD USER STACK POINTER
037024  006506                          MFPI    USP             ;READ USER STACK POINTER
037026  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
037030  022701  007777                  CMP     #7777,R1        ;WAS USER STACK POINTER CHANGED
037034  001401                          BEQ     2$              ;BRANCH IF IT WAS
037036  104070                          ERROR   70              ;USER STACK POINTER NOT CHANGED
037040  012737  030340  177776  2$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
037046  012746  000700                  MOV     #USESTK,-(KSP)  ;GET READY TO RESTORE USER S. POINT
037052  006606                          MTPI    USP             ;RESTORE USER STACK POINTER
037054                          3$:     ;THIS WILL TEST DSTM = 1 MTPI.
037054  012737  037072  001110          MOV     #13$,$LPERR     ;SET LOOP ON ERROR POINTER TO 13$
037062  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
037066  012700  125252                  MOV     #125252,R0      ;LOAD TEST DATA INTO R0
037072  010046                  13$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
037074  105037  172310                  CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
037100  006612                          MTPI    (R2)            ;LOAD TEST DATA INTO PHYSICAL 60000
037102  112737  000006  172310          MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
037110  011201                          MOV     (R2),R1         ;READ FROM ADDRESS 60000
037112  020001                          CMP     R0,R1           ;SEE IF DATA WAS STORED AT CORRECT PLACE
037114  001401                          BEQ     4$              ;BRANCH IF STORE WAS CORRECT
037116  104071                          ERROR   71              ;INCORRECT STORE
037120                          4$:     ;THIS WILL TEST DSTM = 3 MTPI.
037120  012737  037140  001110          MOV     #14$,$LPERR     ;SET LOOP ON ERROR POINTER TO 14$
037126  012737  030340  177776          MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
037134  012700  052525                  MOV     #52525,R0       ;LOAD TEST DATA INTO R0
037140  010046                  14$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
037142  105037  172310                  CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
037146  006637  100000                  MTPI    @#100000        ;LOAD TEST DATA INTO PHYSICAL 60000
037152  112737  000006  172310          MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
037160  013701  100000                  MOV     @#100000,R1     ;READ FROM ADDRESS 60000
037164  020001                          CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
037166  001401                          BEQ     5$              ;BRANCH IF STORE WAS CORRECT
037170  104071                          ERROR   71              ;INCORRECT STORE
037172                          5$:     ;THIS WILL TEST DSTM = 4 MTPI.
037172  012737  037212  001110          MOV     #15$,$LPERR     ;SET LOOP ON ERROR POINTER TO 15$
037200  012737  030340  177776          MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
037206  012700  125252                  MOV     #125252,R0      ;LOAD TEST DATA INTO R0
```

```
5562  037212  010046                          15$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
5563  037214  012702  100002                          MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
5564  037220  105037  172310                          CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
5565  037224  006642                                  MTPI    -(R2)           ;LOAD TEST DATA INTO PHYSICAL 60000
5566  037226  112737  000006  172310                  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
5567  037234  013701  100000                          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
5568  037240  020001                                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
5569  037242  001401                                  BEQ     6$              ;BRANCH IF STORE WAS CORRECT
5570  037244  104071                                  ERROR   71              ;INCORRECT STORE
5571  037246                                  6$:     ;THIS WILL TEST DSTM = 6 MTPI. BELOW ARE THE
5572                                                  ;
5573  037246  012737  037270  001110                  MOV     #16$,$LPERR     ;SET LOOP ON ERROR POINTER TO 16$
5574  037254  012737  030340  177776                  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
5575  037262  012700  052525                          MOV     #52525,R0       ;LOAD TEST DATA INTO R0
5576  037266  005002                                  CLR     R2              ;MAKE REGISTER 2 ZERO
5577  037270  010046                          16$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
5578  037272  105037  172310                          CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
5579  037276  006662  100000                          MTPI    100000(R2)      ;LOAD TEST DATA INTO PHYSICAL 60000
5580  037302  112737  000006  172310                  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
5581  037310  013701  100000                          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
5582  037314  020001                                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
5583  037316  001401                                  BEQ     7$              ;BRANCH IF STORE WAS CORRECT
5584  037320  104071                                  ERROR   71              ;INCORRECT STORE
5585  037322                                  7$:     ;THE FOLLOWING WILL TEST DSTM=2 MTPI.
5586                                                  ;
5587  037322  012737  037346  001110                  MOV     #17$,$LPERR     ;SET LOOP ON ERROR POINTER TO 17$
5588  037330  012737  030340  177776                  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
5589  037336  012700  125252                          MOV     #125252,R0      ;LOAD TEST DATA INTO R0
5590  037342  012702  100000                          MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
5591  037346  010046                          17$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
5592  037350  105037  172310                          CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
5593  037354  006612                                  MTPI    (R2)            ;LOAD TEST DATA INTO PHYSICAL 60000
5594  037356  112737  000006  172310                  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESISENT
5595  037364  013701  100000                          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
5596  037370  020001                                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
5597  037372  001401                                  BEQ     8$              ;BRANCH IF STORE WAS CORRECT
5598  037374  104071                                  ERROR   71              ;INCORRECT STORE
5599  037376                                  8$:     ;THE FOLLOWING WILL TEST DSTM=5 MTPI.
5600                                                  ;
5601  037376  012737  037430  001110                  MOV     #18$,$LPERR     ;SET LOOP ON ERROR POINTER TO 18$
5602  037404  012737  030340  177776                  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
5603  037412  012700  052525                          MOV     #52525,R0       ;LOAD TEST DATA INTO R0
5604  037416  012702  001204                          MOV     #<$TMP2+2>,R2   ;LOAD ADDR. OF LOC. $TMP2+2 INTO R2
5605  037422  012737  100000  001202                  MOV     #100000,$TMP2   ;LOAD VIRT. ADDR. OF TEST LOC. INTO $TMP2
5606  037430  010046                          18$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
5607  037432  105037  172310                          CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
5608  037436  006652                                  MTPI    @-(R2)          ;LOAD TEST DATA INTO PHYSICAL 60000
5609  037440  112737  000006  172310                  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
5610  037446  013701  100000                          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
5611  037452  020001                                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
5612  037454  001401                                  BEQ     9$              ;BRANCH IF STORE WAS CORRECT
5613  037456  104071                                  ERROR   71              ;INCORRECT STORE
5614  037460                                  9$:     ;THE FOLLOWING WILL TEST DSTM=7 MTPI.
5615                                                  ;
5616  037460  012737  037512  001110                  MOV     #19$,$LPERR     ;SET LOOP ON ERROR POINTER TO 19$
5617  037466  012737  030340  177776                  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
```

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5618  037474  012700  125252          MOV     #125252,R0      ;LOAD TEST DATA INTO R0
5619  037500  012737  100000  001202  MOV     #100000,$TMP2   ;LOAD VIRT. ADDR. OF TEST LOCATION
5620                                                          ;INTO LOCATION $TMP2
5621  037506  012702  001202          MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
5622  037512  010046          19$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
5623  037514  105037  172310          CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
5624  037520  006672  000000          MTPI    @0(R2)          ;LOAD TEST DATA INTO PHYSICAL 60000
5625  037524  112737  000006  172310  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
5626  037532  013701  100000          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
5627  037536  020001                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
5628  037540  001401                  BEQ     25$             ;BRANCH IF STORE WAS CORRECT
5629  037542  104071                  ERROR   71              ;INCORRECT STORE
5630  037544  012737  036752  001110  25$:    MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
5631  037552  012737  015430  000250  MOV     #MMTRAP,MMVEC   ;RESTORE M.M. VECTOR TO NORMAL ROUTINE
5632  037560  000423                  BR      TST51           ;;BRANCH TO NEXT TEST
5633
5634
5635  037562  012637  001434  10$:    MOV     (KSP)+,OLDPC    ;SAVE PC & PS OF TRAP
5636  037566  012637  001436          MOV     (KSP)+,OLDPS
5637  037572  013737  177572  001402  MOV     MMR0,PMMR0      ;SAVE MMR0 FOR ERROR TYPEOUT
5638  037600  013737  177576  001404  MOV     MMR2,PMMR2      ;SAVE MMR2 FOR ERROR TYPEOUT
5639  037606  042737  160000  177572  BIC     #160000,MMR0    ;CLEAR ERROR BITS IN MMR0
5640  037614  104067                  ERROR   67              ;TRIED TO LOAD A N.R. PAGE 4
5641  037616  013746  001436          MOV     OLDPS,-(KSP)    ;PUT PC & PS OF TRAP ON STACK
5642  037622  013746  001434          MOV     OLDPC,-(KSP)
5643  037626  000002                  RTI                     ;RETURN TO TEST
5644
5645
5646
5647
5648                                  ;;*****************************************************************
5649                                  ;*TEST 51       MOVE FROM PREVIOUS (KERNEL) I-SPACE TO USER MODE
5650                                  ;*
5651                                  ;*      THIS TEST CHECKS THAT IF THE PREVIOUS MODE IS KERNEL THE
5652                                  ;*       FETCH IS FROM
5653                                  ;*      KERNEL MODE.
5654                                  ;*      THERE IS A DESCRIPTION BEFORE EACH DESTINATION MODE TESTED,
5655                                  ;*
5656                                  ;*
5657                                  ;*      IF THE CORRECT MODE IS NOT ENABLED A NON-RESIDENT ABORT
5658                                  ;*      WILL OCCUR AND TRAP TO 10$, WHERE THE ERRORS ARE REPORTED.
5659                                  ;*
5660  037630                          ;;*****************************************************************
5661  037630  000004          TST51:  SCOPE
5662  037632  012737  040376  001444  MOV     #TST52,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
5663                                                          ;TEST FOR ESCAPE ON PARITY ERRORS
5664  037640  012700  077406          MOV     #77406,R0       ;MAKE ALL USER I-SPACE PAGES RESIDENT
5665                                                          ;READ/WRITE, LENGTH 200 BLOCKS
5666  037644  012702  000010          MOV     #10,R2          ;SET COUNT TO LOAD 8 ADDRESSES
5667  037650  012701  177600          MOV     #UIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
5668  037654  010021          19$:    MOV     R0,(R1)+        ;LOAD R0 INTO PDR ADDRESSED BY R1
5669  037656  077202                  SOB     R2,19$          ;BRANCH BACK TO 19$ IF R2 IS NOT ZERO
5670  037660  012737  037666  001110  MOV     #20$,$LPERR     ;SET LOOP ON ERROR TO 20$
5671  037666  012737  140340  177776  20$:    MOV     #140340,PSW     ;GO TO USER MODE FOR THIS TEST
5672  037674  012737  077406  172310  MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
5673  037702  012737  000600  172350  MOV     #600,KIPAR4     ;MAP KERNEL I PAGE 4 TO 12K
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5674  037710  012737  000600  177650          MOV     #600,UIPAR4     ;MAP USER I PAGE 4 TO 12K
5675  037716  012700  036514                  MOV     #36514,R0       ;LOAD DATA PATTERN INTO R0
5676  037722  010037  100000                  MOV     R0,@#100000     ;LOAD DATA PATTERN INTO PHY 60000
5677  037726  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
5678                                          ;THE FOLLOWING WILL TEST DSTM=0 MFPI
5679                                          ;
5680  037732  012737  040330  000250          MOV     #10$,MMVEC      ;SET M.M. VECTOR TO 10$
5681  037740  105037  177610                  CLRB    UIPDR4          ;MAKE USER I-SPACE PAGE 4 NON-RESIDENT
5682  037744  012737  140340  177776          MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
5683  037752  006506                  1$:     MFPI    KSP             ;PUT KERNEL STACK POINTER ON USER STACK
5684  037754  022706  000700                  CMP     #USESTK,USP     ;WAS SOMETHING PUSHED ON STACK AT 1$
5685  037760  001407                          BEQ     3$              ;BRANCH IF NOTHING WAS PUSHED
5686  037762  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
5687  037764  012702  001100                  MOV     #KERSTK,R2      ;EXPECTING 1100 AS KSP
5688  037770  020201                          CMP     R2,R1           ;DID YOU GET THE RIGHT POINTER?
5689  037772  001403                          BEQ     2$              ;BRANCH IF YOU DID
5690  037774  104064                          ERROR   64              ;WRONG THING WAS PUSHED ON STACK
5691  037776  000401                          BR      2$              ;BRANCH TO NEXT TRY
5692  040000  104065                  3$:     ERROR   65              ;NOTHING PUSHED ON STACK
5693  040002                          2$:     ;THE FOLLOWING WILL TEST DSTM=1 MFPI.
5694  040002  012737  040010  001110          MOV     #12$,$LPERR     ;SET LOOP ON ERROR POINTER TO 12$
5695  040010  012737  140340  177776  12$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
5696  040016  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
5697  040022  006512                          MFPI    (R2)            ;READ FROM PHYSICAL 60000
5698  040024  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
5699  040026  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
5700  040030  001401                          BEQ     4$              ;BRANCH IF CORRECT DATA WAS FETCHED
5701  040032  104066                          ERROR   66              ;WRONG DATA WAS FETCHED
5702  040034                          4$:     ;THE FOLLOWING WILL TEST DSM=2 MFPI.
5703  040034  012737  040042  001110          MOV     #14$,$LPERR     ;SET LOOP ON ERROR POINTER TO 14$
5704  040042  012737  140340  177776  14$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
5705  040050  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
5706  040054  006522                          MFPI    (R2)+           ;READ FROM PHYSICAL 60000
5707  040056  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
5708  040060  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
5709  040062  001401                          BEQ     5$              ;BRANCH IF CORRECT DATA WAS FETCHED
5710  040064  104066                          ERROR   66              ;WRONG DATA WAS FETCHED
5711  040066                          5$:     ;THE FOLLOWING WILL TEST DSTM=3 MFPI.
5712  040066  012737  040074  001110          MOV     #15$,$LPERR     ;SET LOOP ON ERROR POINTER TO 15$
5713  040074  012737  140340  177776  15$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
5714  040102  006537  100000                  MFPI    @#100000        ;READ FROM PHYSICAL 60000
5715  040106  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
5716  040110  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
5717  040112  001401                          BEQ     6$              ;BRANCH IF CORRECT DATA WAS FETCHED
5718  040114  104066                          ERROR   66              ;WRONG DATA WAS FETCHED
5719  040116                          6$:     ;THE FOLLOWING WILL TEST DSTM=4 MFPI.
5720  040116  012737  040124  001110          MOV     #16$,$LPERR     ;SET LOOP ON ERROR POINTER TO 16$
5721  040124  012737  140340  177776  16$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE DERNEL PRESENT USER
5722  040132  012702  100002                  MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
5723  040136  006542                          MFPI    -(R2)           ;READ FROM PHYSICAL 60000
5724  040140  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
5725  040142  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
5726  040144  001401                          BEQ     7$              ;BRANCH IF CORRECT DATA WAS FETCHED
5727  040146  104066                          ERROR   66              ;WRONG DATA WAS FETCHED
5728  040150                          7$:     ;THE FOLLOWING WILL TEST DSTM=5 MFPI.
5729                                          ;
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5730  040150  012737  040156  001110          MOV     #17$,$LPERR     ;SET LOOP ON ERROR POINTER TO 17$
5731  040156  012737  140340  177776  17$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
5732  040164  012737  100000  001202          MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR INTO LOC. $TMP2
5733  040172  012702  001204                  MOV     #<$TMP2+2>,R2   ;LOAD ADDRESS OF $TMP2+2 INTO R2
5734  040176  006552                          MFPI    @-(R2)          ;READ FROM PHYSICAL 60000
5735  040200  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
5736  040202  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
5737  040204  001401                          BEQ     8$              ;BRANCH IF CORRECT DATA FETCHED
5738  040206  104066                          ERROR   66              ;WRONG DATA WAS FETCHED
5739  040210                          8$:     ;THE FOLLOWING WILL TEST DSTM=6 MFPI.
5740
5741  040210  012737  040216  001110          MOV     #18$,$LPERR     ;SET LOOP ON ERROR POINTER TO 18$.
5742  040216  012737  140340  177776  18$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
5743  040224  005002                          CLR     R2              ;MAKE REGISTER 2 A ZERO
5744  040226  006562  100000                  MFPI    100000(R2)      ;READ FROM PHYSICAL 60000
5745  040232  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
5746  040234  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
5747  040236  001401                          BEQ     9$              ;BRANCH IF CORRECT DATA FETCHED
5748  040240  104066                          ERROR   66              ;WRONG DATA WAS FETCHED
5749  040242                          9$:     ;THE FOLLOWING WILL TEST DSTM=7 MFPI.
5750
5751  040242  012737  040250  001110          MOV     #22$,$LPERR     ;SET LOOP ON ERROR POINTER TO 22$
5752  040250  012737  140340  177776  22$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
5753  040256  012737  100000  001202          MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR. INTO $TMP2
5754  040264  012702  001202                  MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
5755  040270  006572  000000                  MFPI    @0(R2)          ;READ FROM PHYSICAL 60000
5756  040274  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
5757  040276  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
5758  040300  001401                          BEQ     25$             ;BRANCH IF CORRECT DATA FETCHED
5759  040302  104066                          ERROR   66              ;WRONG DATA WAS FETCHED
5760  040304  012737  015430  000250  25$:    MOV     #MMTRAP,MMVEC   ;SET M.M. VECTOR TO NORMAL ROUTINE
5761  040312  012737  000340  177776          MOV     #00340,PSW      ;GO BACK TO KERNEL MODE, PREVIOUS KERNEL
5762  040320  012737  037666  001110          MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
5763  040326  000423                          BR      TST52           ;;BRANCH TO NEXT TEXT
5764
5765
5766  040330  012637  001434          10$:    MOV     (KSP)+,OLDPC    ;SAVE PC & PS OF TRAP
5767  040334  012637  001436                  MOV     (KSP)+,OLDPS
5768  040340  013737  177572  001402          MOV     MMR0,PMMR0      ;SAVE MMR0 FOR ERROR TYPEOUT
5769  040346  013737  177576  001404          MOV     MMR2,PMMR2      ;SAVE MMR2 FOR ERROR TYPEOUT
5770  040354  042737  160000  177572          BIC     #160000,MMR0    ;CLEAR ERROR BITS IN MMR0
5771  040362  104067                          ERROR   67              ;TRIED TO READ NON-RESIDENT PAGE
5772  040364  013746  001436                  MOV     OLDPS,-(KSP)    ;PUT PC & PS OF TRAP ON STACK
5773  040370  013746  001434                  MOV     OLDPC,-(KSP)
5774  040374  000002                          RTI                     ;RETURN TO TEST
5775
5776                                  ;;**************************************************************
5777                                  ;*TEST 52       MOVE FROM/TO D-SPACE = MOVE FROM/TO I-SPACE
5778                                  ;*
5779                                  ;*       THIS TEST CHECKS THAT SINCE THERE IS NO DISTINCTION
5780                                  ;*       BETWEEN INSTRUCTION AND DATA SPACE IN THE 11/6X & 11/40
5781                                  ;*       MFPD & MTPD SHOULD BE DECODED THE SAME AS MFPI & MTPI.
5782                                  ;*
5783                                  ;;**************************************************************
5784  040376                          TST52:
5785  040376  000004                          SCOPE
```

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5786  040400  012737  040510  001444          MOV     #TST53,NXTTST   ;SAVE STARTING ADDRESS OF NEXT
5787                                                                    ;TEST FOR ESCAPE ON PARITY ERRORS
5788  040406  012737  030340  177776  20$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE=USER,CURRENT=KERNEL
5789  040414  106506                          MFPD    USP             ;MFPD SHOULD ACT LIKE MFPI PUTTING
5790                                                                    ;USER STACK POINTER ON THE KERNEL STACK
5791  040416  022706  001100                  CMP     #KERSTK,KSP     ;WAS SOMETHING PUSHED ON KERNEL STACK?
5792  040422  001407                          BEQ     2$              ;BRANCH IF NO
5793  040424  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
5794  040426  012702  000700                  MOV     #USESTK,R2      ;EXPECTING TO GET 700 AS USP
5795  040432  020201                          CMP     R2,R1           ;DID GET RIGHT POINTER VALUE?
5796  040434  001403                          BEQ     3$              ;BRANCH IF YES
5797  040436  104064                          ERROR   64              ;WRONG THING WAS PUSHED ON STACK
5798  040440  000401                          BR      3$              ;BRANCH TO NEXT TRY
5799  040442  104065          2$:             ERROR   65              ;NOTHING PUSHED ON STACK
5800  040444  012737  040452  001110  3$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
5801  040452  012746  007777          4$:     MOV     #7777,-(KSP)    ;PUSH DATA ON KERNEL STACK
5802  040456  106606                          MTPD    USP             ;LOAD THE USER STACK POINTER
5803  040460  106506                          MFPD    USP             ;READ USER STACK POINTER
5804  040462  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
5805  040464  022701  007777                  CMP     #7777,R1        ;WAS USER STACK POINTER CHANGED?
5806  040470  001401                          BEQ     5$              ;BRANCH IF YES
5807  040472  104070                          ERROR   70              ;USER STACK POINTER NOT CHANGED
5808  040474  012746  000700          5$:     MOV     #USESTK,-(KSP)  ;GET READY TO RESTORE USER STK. PTR.
5809  040500  106606                          MTPD    USP             ;RESTORE USER STACK POINTER
5810  040502  012737  040406  001110          MOV     #20$,$LPERR     ;SET LOOP POINTER TO START OF TEST
5811
5812                                  ;*****************************************************************
5813                                  ;*TEST 53       MOVE FROM PREVIOUS I=SPACE (PREVIOUS=CURRENT=KERNEL)
5814                                  ;*
5815                                  ;*      THIS TEST CHECKS THAT IF BOTH PREVIOUS AND CURRENT MODES
5816                                  ;*      ARE KERNEL, AND THE SOURCE MODE IS 0, THE DESTINATION
5817                                  ;*      STACK IS NOT DECREMENTED BEFORE ACCESS.
5818                                  ;*      (FOR 11/40 THIS IS PURPOSE OF 'HOOK MUX')
5819                                  ;*      "MFPI KSP" SHOULD PUSH THE NON-DECREMENTED VALUE
5820                                  ;*      OF KSP (1100) ONTO THE STACK (AT LOC. 1076).
5821                                  ;*****************************************************************
5822  040510  000004                  TST53:  SCOPE
5823  040512  012737  040626  001444          MOV     #$EOP,NXTTST    ;SET ESCAPE POINTER TO EOP ROUTINE
5824  040520  012737  040526  001110          MOV     #20$,$LPERR     ;SET LOOP ON ERROR POINTER TO 20$
5825  040526  005037  177776          20$:    CLR     @#PSW           ;SET PREVIOUS = CURRENT = KERNEL
5826  040532  012700  001100                  MOV     #STACK,R0       ;SETUP VALUE FOR STACK POINTER
5827  040536  010006                          MOV     R0,KSP          ;LOAD STACK POINTER
5828  040540  006506                          MFPI    KSP             ;THE VALUE "STACK" SHOULD BE PUSHED
5829                                                                  ;BEFORE BEING DECREMENTED
5830  040542  011601                          MOV     (KSP),R1        ;READ DATA WHICH WAS PUSHED
5831  040544  020001                          CMP     R0,R1           ;WAS THE ORIGINAL VALUE OF THE
5832                                                                  ;STACK POINTER PUSHED?
5833  040546  001401                          BEQ     1$              ;BRANCH IF YES
5834  040550  104066                          ERROR   66              ;MFPI FETCHED WRONG DATA
5835  040552  005740                  1$:     TST     -(R0)           ;SETUP EXPECTED STACK POINTER VALUE
5836  040554  020600                          CMP     KSP,R0          ;WAS THE STACK POINTER DECREMENTED?
5837  040556  001401                          BEQ     2$              ;BRANCH IF YES
5838  040560  104065                          ERROR   65              ;STACK NOT PUSHED BY THE MFPI
5839  040562  012706  001100          2$:     MOV     #STACK,KSP      ;RESTORE STACK POINTER
5840  040566  000417                          BR      $EOP
5841                                  ;*****************************************************************
```

```
                                ;       ROUTINE TO CLR MED REGISTERS
                                ;       NOT ALL MED REGISTERS ARE CLEARED
                                ;       ONLY THOSE USED BY THIS DIAGNOSTIC
040570  012700  000000          CLRUW:  MOV     #0,R0           ;CLR R0 TO WRITE INTO MED'S
040574  076600                          MED
040576  000300                          WLJAM           ;LOG JAM REG
040600  076600                          MED
040602  000301                          WLSERV          ;LOG SERVICE REG
040604  076600                          MED
040606  000304                          WLFGIN          ;LOG FLAG INTERUPT REG
040610  076600                          MED
040612  000222                          WWHAM           ;WHAMI REG
040614  076600                          MED
040616  000226                          WCNSSW          ;CONSOLE SWITCH REG
040620  076600                          MED
040622  000305                          WLWHAM          ;LOG WHAMI REG
040624  000207                          RTS     PC
                                ;*****************************************************************
                                
                                
                                
                                
                                
                                .SBTTL  ************************************************************************
                                
                                .SBTTL  END OF PASS ROUTINE
                                
                                ;;*****************************************************************
                                ;*INCREMENT THE PASS NUMBER ($PASS)
                                ;*TYPE "END PASS #XXXXX TOTAL NUMBER OF ERRORS SINCE LAST REPORT YYYYY"
                                ;*WHERE XXXXX AND YYYYY ARE DECIMAL NUMBERS
                                ;*IF SW12=1 INHIBIT TRACE TRAP
                                ;*IF THERES A MONITOR GO TO IT
                                ;*IF THERE ISN'T JUMP TO LOOP
040626                          $EOP:
040626  000004                          SCOPE
040630  005037  001102                  CLR     $TSTNM          ;;ZERO THE TEST NUMBER
040634  005037  001212                  CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
040640  005237  001234                  INC     $PASS           ;;INCREMENT THE PASS NUMBER
040644  042737  100000  001234          BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
040652  005327                          DEC     (PC)+           ;;LOOP?
040654  000001          $EOPCT: .WORD   1
040656  003072                  BGT     $DOAGN          ;;YES
040660  012737                  MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
040662  000001          $ENDCT: .WORD   1
040664  040654                  $EOPCT
040666  104401  040674                  TYPE    ,65$            ;;TYPE ASCIZ STRING
040672  000407                          BR      64$             ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <12><15>/END PASS #/
040712                          64$:
040712  013746  001234                  MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
                                                                ;;TYPE PASS NUMBER
040716  104405                          TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
040720  104401  040726                  TYPE    .67$            ;;TYPE ASCIZ STRING
```

```
5898  040724  000421
5899
5900  040770
5901  040770  013746  001112
5902
5903  040774  104405
5904  040776  104401  001223
5905  041002  005037  001112
5906  041006  013700  000042
5907  041012  001414
5908  041014  005046
5909  041016  012746  041024
5910  041022  000426
5911
5912  041024
5913  041024  013700  000042
5914  041030  001405
5915  041032  000005
5916  041034  004710
5917  041036  000240
5918  041040  000240
5919  041042  000240
5920  041044
5921  041044  104400
5922  041046  042716  000020
5923  041052  032777  010000  140060
5924  041060  001005
5925  041062  005137  041106
5926  041066  100402
5927  041070  052716  000020
5928  041074  012746  041102
5929  041100  000002
5930
5931
5932  041102
5933  041102  000137
5934  041104  020620
5935  041106  000000
5936  041110     377     377     000
5937          041114
5938
5939
5940
5941
5942
5943
5944
5945
5946
5947
5948
5949
5950
5951
5952
5953
```

```
        BR      66$                     ;;GET OVER THE ASCIZ
;;67$:  .ASCIZ  /  TOTAL ERRORS SINCE LAST REPORT /
66$:
        MOV     $ERTTL,-(SP)            ;;SAVE $ERTTL FOR TYPEOUT
                                        ;;TOTAL NUMBER OF ERRORS
        TYPDS                           ;;GO TYPE--DECIMAL ASCII WITH SIGN
        TYPE    ,$CRLF                  ;;TYPE CARRIAGE RETURN, LINE FEED
        CLR     $ERTTL                  ;;CLEAR ERROR TOTAL
$GET42: MOV     @#42,R0                 ;;GET MONITOR ADDRESS
        BEQ     $DOAGN                  ;;BRANCH IF NO MONITOR
        CLR     -(SP)                   ;;INSURE THE "T" BIT IS CLEAR
        MOV     #$CLR.T,-(SP)           ;;SETUP FOR AN RTI OR RTT
        BR      $RTRN                   ;;GO DO AN RTI OR RTT TO LOAD THE PSW
                                        ;;WITH A CLEARED "T" BIT
$CLR.T:
        MOV     @#42,R0                 ;;INSURE R0 CONTAINS THE MONITORS
        BEQ     $DOAGN                  ;;RETURN ADDRESS
        RESET                           ;;CLEAR THE WORLD
$ENDAD: JSR     PC,(R0)                 ;;GO TO MONITOR
        NOP                             ;;SAVE ROOM
        NOP                             ;;FOR
        NOP                             ;;ACT11
$DOAGN:
        TRAP                            ;;PUSH OLD PSW AND PC ON STACK
        BIC     #20,(SP)                ;;CLEAR THE "T" BIT
        BIT     #BIT12,@SWR             ;;RUN WITH TRACE TRAP?
        BNE     1$                      ;;BR IF NO
        COM     $TBIT                   ;;IS IT TIME FOR TRACE TRAP
        BMI     1$                      ;;BR IF NO
        BIS     #20,(SP)                ;;SET TRACE TRAP
1$:     MOV     #$LOOP,-(SP)            ;;JUMP TO START OF TEST
$RTRN:  RTI                             ;;RETURN--THIS IS CHANGED TO
                                        ;;AN "RTT" IF "RTT" IS A LEGAL
                                        ;;INSTRUCTION
$LOOP:
        JMP     @(PC)+                  ;;RETURN
$RTNAD: .WORD   LOOP
$TBIT:  .WORD   0                       ;;"T" BIT STATE INDICATOR
$ENULL: .BYTE   -1,-1,0                 ;;NULL CHARACTER STRING
        .EVEN

.SBTTL  SAVE AND RESTORE R0-R5 ROUTINES

;;**************************************************************
;*SAVE R0-R5
;*CALL:
;*      SAVREG
;*UPON RETURN FROM $SAVREG THE STACK WILL LOOK LIKE:
;*
;*TOP---(+16)
;* +2---(+18)
;* +4---R5
;* +6---R4
;* +8---R3
;*+10---R2
;*+12---R1
```

```
                                        ;**14---R0

                                        $SAVREG:
                                                MOV     R0,-(SP)        ;;PUSH R0 ON STACK
                                                MOV     R1,-(SP)        ;;PUSH R1 ON STACK
                                                MOV     R2,-(SP)        ;;PUSH R2 ON STACK
                                                MOV     R3,-(SP)        ;;PUSH R3 ON STACK
                                                MOV     R4,-(SP)        ;;PUSH R4 ON STACK
                                                MOV     R5,-(SP)        ;;PUSH R5 ON STACK
                                                MOV     22(SP),-(SP)    ;;SAVE PS OF MAIN FLOW
                                                MOV     22(SP),-(SP)    ;;SAVE PC OF MAIN FLOW
                                                MOV     22(SP),-(SP)    ;;SAVE PS OF CALL
                                                MOV     22(SP),-(SP)    ;;SAVE PC OF CALL
                                                RTI

                                        ;*RESTORE R0-R5
                                        ;*CALL:
                                        ;*      RESREG
                                        $RESREG:
                                                MOV     (SP)+,22(SP)    ;;RESTORE PC OF CALL
                                                MOV     (SP)+,22(SP)    ;;RESTORE PS OF CALL
                                                MOV     (SP)+,22(SP)    ;;RESTORE PC OF MAIN FLOW
                                                MOV     (SP)+,22(SP)    ;;RESTORE PS OF MAIN FLOW
                                                MOV     (SP)+,R5        ;;POP STACK INTO R5
                                                MOV     (SP)+,R4        ;;POP STACK INTO R4
                                                MOV     (SP)+,R3        ;;POP STACK INTO R3
                                                MOV     (SP)+,R2        ;;POP STACK INTO R2
                                                MOV     (SP)+,R1        ;;POP STACK INTO R1
                                                MOV     (SP)+,R0        ;;POP STACK INTO R0
                                                RTI
                                        .SBTTL  TYPE ROUTINE

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

041210  105737  001157          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
041214  100002                  1$:     BPL     1$              ;;BR IF YES
041216  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
041220  000430                          BR      3$              ;;LEAVE
041222  010046                          MOV     R0,-(SP)        ;;SAVE R0
041224  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
041230  122737  000001  001246          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
041236  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
041240  132737  000100  001247          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
```

```
 6010  041246  001405                        BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
 6011  041250  010037  041260                MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
 6012  041254  004737  041500                JSR     PC,$ATY2        ;;SPOOL MESSAGE TO APT
 6013  041260  000000              61$:      .WORD   0               ;;MESSAGE ADDRESS
 6014  041262  132737  000040  001247 62$:   BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
 6015  041270  001003                        BNE     60$             ;;YES,SKIP TYPE OUT
 6016  041272  112046              2$:       MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
 6017  041274  001005                        BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
 6018  041276  005726                        TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
 6019  041300  012600              60$:      MOV     (SP)+,R0        ;;RESTORE R0
 6020  041302  062716  000002        3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
 6021  041306  000002                        RTI                     ;;RETURN
 6022  041310  122716  000011        4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
 6023  041314  001430                        BEQ     8$
 6024  041316  122716  000200                CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
 6025  041322  001006                        BNE     5$
 6026  041324  005726                        TST     (SP)+           ;;POP  <CR><LF> EQUIV
 6027  041326  104401                        TYPE                    ;;TYPE A CR AND LF
 6028  041330  001223                        $CRLF
 6029  041332  105037  041466                CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
 6030  041336  000755                        BR      2$              ;;GET NEXT CHARACTER
 6031  041340  004737  041422        5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
 6032  041344  123726  001156        6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
 6033  041350  001350                        BNE     2$              ;;IF NO GO GET NEXT CHAR.
 6034  041352  013746  001154                MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
 6035                                                                ;;AND THE NULL CHAR.
 6036  041356  105366  000001        7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
 6037  041362  002770                        BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
 6038  041364  004737  041422                JSR     PC,$TYPEC       ;;GO TYPE A NULL
 6039  041370  105337  041466                DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
 6040  041374  000770                        BR      7$              ;;LOOP
 6041
 6042                                        ;HORIZONTAL TAB PROCESSOR
 6043
 6044  041376  112716  000040        8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
 6045  041402  004737  041422        9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
 6046  041406  132737  000007  041466        BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
 6047  041414  001372                        BNE     9$              ;;TAB STOP
 6048  041416  005726                        TST     (SP)+           ;;POP SPACE OFF STACK
 6049  041420  000724                        BR      2$              ;;GET NEXT CHARACTER
 6050  041422  105777  137522        $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
 6051  041426  100375                        BPL     $TYPEC
 6052  041430  116677  000002  137514        MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
 6053  041436  122766  000015  000002        CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
 6054  041444  001003                        BNE     1$              ;;BRANCH IF NO
 6055  041446  105037  041466                CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
 6056  041452  000406                        BR      $TYPEX          ;;EXIT
 6057  041454  122766  000012  000002 1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
 6058  041462  001402                        BEQ     $TYPEX          ;;BRANCH IF YES
 6059  041464  105227                        INCB    (PC)+           ;;COUNT THE CHARACTER
 6060  041466  000000        $CHARCNT:.WORD  0                       ;;CHARACTER COUNT STORAGE
 6061  041470  000207        $TYPEX: RTS     PC
 6062
 6063                                        .SBTTL  APT COMMUNICATIONS ROUTINE
 6064
 6065                                        ;;**************************************************************
```

```
6066  041472  112737  000001  041736  $ATY1:  MOVB    #1,$FFLG          ;;TO REPORT FATAL ERROR
6067  041500  112737  000001  041734  $ATY3:  MOVB    #1,$MFLG          ;;TO TYPE A MESSAGE
6068  041506  000403                  BR      $ATYC
6069  041510  112737  000001  041736  $ATY4:  MOVB    #1,$FFLG          ;;TO ONLY REPORT FATAL ERROR
6070  041516                  $ATYC:
6071  041516  010046                          MOV     R0,-(SP)          ;;PUSH R0 ON STACK
6072  041520  010146                          MOV     R1,-(SP)          ;;PUSH R1 ON STACK
6073  041522  105737  041734                TSTB    $MFLG             ;;SHOULD TYPE A MESSAGE?
6074  041526  001450                  BEQ     5$                ;;IF NOT:  BR
6075  041530  122737  000001  001246        CMPB    #APTENV,$ENV      ;;OPERATING UNDER APT?
6076  041536  001031                  BNE     3$                ;;IF NOT:  BR
6077  041540  132737  000100  001247        BITB    #APTSPOOL,$ENVM   ;;SHOULD SPOOL MESSAGES?
6078  041546  001425                  BEQ     3$                ;;IF NOT:  BR
6079  041550  017600  000004                MOV     @4(SP),R0         ;;GET MESSAGE ADDR.
6080  041554  062766  000002  000004        ADD     #2,4(SP)                  ;;BUMP RETURN ADDR.
6081  041562  005737  001226          1$:   TST     $MSGTYPE          ;;SEE IF DONE W/ LAST XMISSION?
6082  041566  001375                  BNE     1$                ;;IF NOT:  WAIT
6083  041570  010037  001242                MOV     R0,$MSGAD         ;;PUT ADDR IN MAILBOX
6084  041574  105720            2$:   TSTB    (R0)+             ;;FIND END OF MESSAGE
6085  041576  001376                  BNE     2$
6086  041600  163700  001242                SUB     $MSGAD,R0         ;;SUB START OF MESSAGE
6087  041604  006200                          ASR     R0                ;;GET MESSAGE LNGTH IN WORDS
6088  041606  010037  001244                MOV     R0,$MSGLGT        ;;PUT LENGTH IN MAILBOX
6089  041612  012737  000004  001226        MOV     #4,$MSGTYPE       ;;TELL APT TO TAKE MSG.
6090  041620  000413                  BR      5$
6091  041622  017637  000004  041646  3$:   MOV     @4(SP),4$         ;;PUT MSG ADDR IN JSR LINKAGE
6092  041630  062766  000002  000004        ADD     #2,4(SP)                  ;;BUMP RETURN ADDRESS
6093  041636  013746  177776                MOV     177776,-(SP)      ;;PUSH 177776 ON STACK
6094  041642  004737  041210                JSR     PC,$TYPE          ;;CALL TYPE MACRO
6095  041646  000000            4$:   .WORD   0
6096  041650                    5$:
6097  041650  105737  041736          10$:  TSTB    $FFLG             ;;SHOULD REPORT FATAL ERROR?
6098  041654  001416                  BEQ     12$               ;;IF NOT:  BR
6099  041656  005737  001246                TST     $ENV              ;;RUNNING UNDER APT?
6100  041662  001413                  BEQ     12$               ;;IF NOT:  BR
6101  041664  005737  001226          11$:  TST     $MSGTYPE          ;;FINISHED LAST MESSAGE?
6102  041670  001375                  BNE     11$               ;;IF NOT:  WAIT
6103  041672  017637  000004  001230        MOV     @4(SP),$FATAL     ;;GET ERROR #
6104  041700  062766  000002  000004        ADD     #2,4(SP)                  ;;BUMP RETURN ADDR.
6105  041706  005237  001226                INC     $MSGTYPE          ;;TELL APT TO TAKE ERROR
6106  041712  105037  041736          12$:  CLRB    $FFLG             ;;CLEAR FATAL FLAG
6107  041716  105037  041735                CLRB    $LFLG             ;;CLEAR LOG FLAG
6108  041722  105037  041734                CLRB    $MFLG             ;;CLEAR MESSAGE FLAG
6109  041726  012601                          MOV     (SP)+,R1          ;;POP STACK INTO R1
6110  041730  012600                          MOV     (SP)+,R0          ;;POP STACK INTO R0
6111  041732  000207                          RTS     PC                ;;RETURN
6112  041734     000          $MFLG:  .BYTE   0                 ;;MESSG. FLAG
6113  041735     000          $LFLG:  .BYTE   0                 ;;LOG FLAG
6114  041736     000          $FFLG:  .BYTE   0                 ;;FATAL FLAG
6115              041740                  .EVEN
6116              000200          APTSIZE=200
6117              000001          APTENV=001
6118              000100          APTSPOOL=100
6119              000040          APTCSUP=040
6120                              .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
6121
```

```
 6122                                   ;;*****************************************************************
 6123                                   ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
 6124                                   ;*OCTAL (ASCII) NUMBER AND TYPE IT.
 6125                                   ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
 6126                                   ;*CALL:
 6127                                   ;*       MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
 6128                                   ;*       TYPOS                   ;;CALL FOR TYPEOUT
 6129                                   ;*       .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
 6130                                   ;*       .BYTE   M               ;;M=1 OR 0
 6131                                   ;*                                       ;;1=TYPE LEADING ZEROS
 6132                                   ;*                                       ;;0=SUPPRESS LEADING ZEROS
 6133                                   ;*
 6134                                   ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
 6135                                   ;*$TYPOS OR $TYPOC
 6136                                   ;*CALL:
 6137                                   ;*       MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
 6138                                   ;*       TYPON                   ;;CALL FOR TYPEOUT
 6139                                   ;*
 6140                                   ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
 6141                                   ;*CALL:
 6142                                   ;*       MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
 6143                                   ;*       TYPOC                   ;;CALL FOR TYPEOUT
 6144
 6145  041740  017646  000000           $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
 6146  041744  116637  000001  042163           MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
 6147  041752  112637  042165                   MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
 6148  041756  062716  000002                   ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
 6149  041762  000406                           BR      $TYPON
 6150  041764  112737  000001  042163  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
 6151  041772  112737  000006  042165           MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
 6152  042000  112737  000005  042162  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
 6153  042006  010346                           MOV     R3,-(SP)        ;;SAVE R3
 6154  042010  010446                           MOV     R4,-(SP)        ;;SAVE R4
 6155  042012  010546                           MOV     R5,-(SP)        ;;SAVE R5
 6156  042014  113704  042165                   MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
 6157  042020  005404                           NEG     R4
 6158  042022  062704  000006                   ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
 6159  042026  110437  042164                   MOVB    R4,$OMODE       ;;SAVE IT FOR USE
 6160  042032  113704  042163                   MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
 6161  042036  016605  000012                   MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
 6162  042042  005003                           CLR     R3              ;;CLEAR THE OUTPUT WORD
 6163  042044  006105                   1$:     ROL     R5              ;;ROTATE MSB INTO "C"
 6164  042046  000404                           BR      3$              ;;GO DO MSB
 6165  042050  006105                   2$:     ROL     R5              ;;FORM THIS DIGIT
 6166  042052  006105                           ROL     R5
 6167  042054  006105                           ROL     R5
 6168  042056  010503                           MOV     R5,R3
 6169  042060  006103                   3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
 6170  042062  105337  042164                   DECB    $OMODE          ;;TYPE THIS DIGIT?
 6171  042066  100016                           BPL     7$              ;;BR IF NO
 6172  042070  042703  177770                   BIC     #177770,R3      ;;GET RID OF JUNK
 6173  042074  001002                           BNE     4$              ;;TEST FOR 0
 6174  042076  005704                           TST     R4              ;;SUPPRESS THIS 0?
 6175  042100  001403                           BEQ     5$              ;;BR IF YES
 6176  042102  005204                   4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
 6177  042104  052703  000060                   BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
```

```
6178  042110  052703  000040          5$:     BIS     #'  ,R3         ;;MAKE ASCII IF NOT ALREADY
6179  042114  110337  042160                  MOVB    R3,8$           ;;SAVE FOR TYPING
6180  042120  104401  042160                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
6181  042124  105337  042162          7$:     DECB    $OCNT           ;;COUNT BY 1
6182  042130  003347                          BGT     2$              ;;BR IF MORE TO DO
6183  042132  002402                          BLT     6$              ;;BR IF DONE
6184  042134  005204                          INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
6185  042136  000744                          BR      2$              ;;GO DO THE LAST DIGIT
6186  042140  012605          6$:     MOV     (SP)+,R5        ;;RESTORE R5
6187  042142  012604                  MOV     (SP)+,R4        ;;RESTORE R4
6188  042144  012603                  MOV     (SP)+,R3        ;;RESTORE R3
6189  042146  016666  000002  000004          MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
6190  042154  012616                  MOV     (SP)+,(SP)
6191  042156  000002                  RTI                     ;;RETURN
6192  042160     000          8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
6193  042161     000                  .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
6194  042162     000          $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
6195  042163     000          $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
6196  042164  000000          $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
6197                          .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
6198
6199                          ;;**************************************************************
6200                          ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
6201                          ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
6202                          ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
6203                          ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
6204                          ;*REPLACED WITH SPACES.
6205                          ;*CALL:
6206                          ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
6207                          ;*      TYPDS                   ;;GO TO THE ROUTINE
6208
6209  042166                  $TYPDS:
6210  042166  010046                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
6211  042170  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
6212  042172  010246                  MOV     R2,-(SP)        ;;PUSH R2 ON STACK
6213  042174  010346                  MOV     R3,-(SP)        ;;PUSH R3 ON STACK
6214  042176  010546                  MOV     R5,-(SP)        ;;PUSH R5 ON STACK
6215  042200  012746  020200          MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
6216  042204  016605  000020          MOV     20(SP),R5       ;;GET THE INPUT NUMBER
6217  042210  100004                  BPL     1$              ;;BR IF INPUT IS POS.
6218  042212  005405                  NEG     R5              ;;MAKE THE BINARY NUMBER POS.
6219  042214  112766  000055  000001          MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
6220  042222  005000          1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
6221  042224  012703  042402          MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
6222  042230  112723  000040          MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
6223  042234  005002          2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
6224  042236  016001  042372          MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
6225  042242  160105          3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
6226  042244  002402                  BLT     4$              ;;BR IF DONE
6227  042246  005202                  INC     R2              ;;INCREASE THE BCD DIGIT BY 1
6228  042250  000774                  BR      3$
6229  042252  060105          4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
6230  042254  005702                  TST     R2              ;;CHECK IF BCD DIGIT=0
6231  042256  001002                  BNE     5$              ;;FALL THROUGH IF 0
6232  042260  105716                  TSTB    (SP)            ;;STILL DOING LEADING 0'S?
6233  042262  100407                  BMI     7$              ;;BR IF YES
```

```
6234  042264  106316                  5$:     ASLB    (SP)            ;;MSD?
6235  042266  103003                          BCC     6$              ;;BR IF NO
6236  042270  116663  000001  177777          MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
6237  042276  052702  000060          6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
6238  042302  052702  000040          7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
6239  042306  110223                          MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
6240  042310  005720                          TST     (R0)+           ;;JUST INCREMENTING
6241  042312  020027  000010                  CMP     R0,#10          ;;CHECK THE TABLE INDEX
6242  042316  002746                          BLT     2$              ;;GO DO THE NEXT DIGIT
6243  042320  003002                          BGT     8$              ;;GO TO EXIT
6244  042322  010502                          MOV     R5,R2           ;;GET THE LSD
6245  042324  000764                          BR      6$              ;;GO CHANGE TO ASCII
6246  042326  105726                  8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
6247  042330  100003                          BPL     9$              ;;BR IF NO
6248  042332  116663  177777  177776          MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
6249  042340  105013                  9$:     CLRB    (R3)            ;;SET THE TERMINATOR
6250  042342  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
6251  042344  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
6252  042346  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
6253  042350  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
6254  042352  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
6255  042354  104401  042402                  TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
6256  042360  016666  000002  000004          MOV     2(SP),4(SP)     ;;ADJUST THE STACK
6257  042366  012616                          MOV     (SP)+,(SP)
6258  042370  000002                          RTI                     ;;RETURN TO USER
6259  042372  023420                  $DTBL:  10000.
6260  042374  001750                          1000.
6261  042376  000144                          100.
6262  042400  000012                          10.
6263  042402  000004                  $DBLK:  .BLKW   4
6264                                  .SBTTL  TRAP DECODER
6265
6266                                  ;;**************************************************************
6267                                  ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
6268                                  ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
6269                                  ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
6270                                  ;*GO TO THAT ROUTINE.
6271
6272  042412  010046                  $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
6273  042414  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
6274  042420  005740                          TST     -(R0)           ;;BACKUP BY 2
6275  042422  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
6276  042424  006300                          ASL     R0              ;;POSITION FOR INDEXING
6277  042426  016000  042446                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
6278  042432  000200                          RTS     R0              ;;GO TO ROUTINE
6279
6280
6281                                  ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
6282
6283  042434  011646                  $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
6284  042436  016666  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
6285  042444  000002                          RTI                     ;;RESTORE THE PSW
6286
6287                                  .SBTTL  TRAP TABLE
6288
6289                                  ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
```

```
                                        ;*BY THE "TRAP" INSTRUCTION.

                                        ;       ROUTINE
                                        ;       -------
042446  042434                  $TRPAD: .WORD   $TRAP2
042450  041210                          $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
042452  041764                          $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
042454  041740                          $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
042456  042000                          $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
042460  042166                          $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)

042462  041114                          $SAVREG ;;CALL=SAVREG   TRAP+6(104406)  SAVE R0-R5 ROUTINE
042464  041152                          $RESREG ;;CALL=RESREG   TRAP+7(104407)  RESTORE R0-R5 ROUTINE
042466  044172                          TBITOFF ;;CALL=TBITO    TRAP+10(104410) TURN OFF T-BIT TRAPPING
042470  044220                          TBITRESTORE     ;;CALL=TBITR    TRAP+11(104411) RETURN T-BIT TO ITS PREVIOUS CON

                                        .SBTTL  POWER DOWN AND UP ROUTINES

                                        ;;**************************************************************
                                        ;POWER DOWN ROUTINE
042472  012737  042664  000024  $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
042500  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
042506  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
042510  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
042512  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
042514  010346                          MOV     R3,-(SP)        ;;PUSH R3 ON STACK
042516  010446                          MOV     R4,-(SP)        ;;PUSH R4 ON STACK
042520  010546                          MOV     R5,-(SP)        ;;PUSH R5 ON STACK
042522  017746  136412                  MOV     @SWR,-(SP)      ;;PUSH @SWR ON STACK
042526  010637  042670                  MOV     SP,$SAVR6       ;;SAVE SP
042532  012737  042544  000024          MOV     #$PWRUP,@#PWRVEC ;;SET UP VECTOR
042540  000000                          HALT
042542  000776                          BR      .-2             ;;HANG UP

                                        ;;**************************************************************
                                        ;POWER UP ROUTINE
042544  012737  042664  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST DOWN
042552  013706  042670                  MOV     $SAVR6,SP       ;;GET SP
042556  005037  042670                  CLR     $SAVR6          ;;WAIT LOOP FOR THE TTY
042562  005237  042670          1$:     INC     $SAVR6          ;;WAIT FOR THE INC
042566  001375                          BNE     1$              ;;OF  WORD
042570  105 37  001446                  TSTB    FORTY           ;EXECUTING ON AN 11/40?
042574  001003                          BNE     2$              ;BRANCH IF YES
042576  011600                          MOV     (SP),R0         ;GET OLD SW. REG. CONTENTS
042600  076600                          MED                     ;WRITE THE CONSOLE SW. REG.
042602  000226                          WCNSSW                  ;  WITH ITS PREVIOUS VALUE
042604                          2$:
042604  012677  136330                  MOV     (SP)+,@SWR      ;;POP STACK INTO @SWR
042610  012605                          MOV     (SP)+,R5        ;;POP STACK INTO R5
042612  012604                          MOV     (SP)+,R4        ;;POP STACK INTO R4
042614  012603                          MOV     (SP)+,R3        ;;POP STACK INTO R3
042616  012602                          MOV     (SP)+,R2        ;;POP STACK INTO R2
042620  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
042622  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
042624  012737  042472  000024          MOV     #$PWRDN,@#PWRVEC ;;SET UP THE POWER DOWN VECTOR
```

```
6346  042632  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;PRIO:7
6347  042640  104401                          TYPE                    ;;REPORT THE POWER FAILURE
6348  042642  042672                $PWRMG:   .WORD   PWRMSG          ;;POWER FAIL MESSAGE POINTER
6349  042644  012716                          MOV     (PC)+,(SP)      ;;RESTART AT START
6350  042646  020066                $PWRAD:   .WORD   START           ;;RESTART ADDRESS
6351  042650  042766  000020  000002          BIC     #20,2(SP)       ;;CLEAR "T" BIT
6352  042656  005037  041106                  CLR     $TBIT           ;;CLEAR THE "T" BIT FLAG
6353  042662  000002                          RTI
6354  042664  000000                $ILLUP:   HALT                    ;;THE POWER UP SEQUENCE WAS STARTED
6355  042666  000776                          BR      .-2             ;; BEFORE THE POWER DOWN WAS COMPLETE
6356  042670  000000                $SAVR6:   0                       ;;PUT THE SP HERE
6357  042672  006412  047520  042527  PWRMSG: .ASCIZ   <12><15>?POWER FAILURE, RESTARTING PROGRAM?
6358  042700  020122  040506  046111
6359  042706  051125  026105  051040
6360  042714  051505  040524  052122
6361  042722  047111  020107  051120
6362  042730  043517  040522  000115
6363                                  .EVEN
6364
6365                          .SBTTL  DOUBLE LENGTH BINARY TO OCTAL ASCII CONVERT ROUTINE
6366
6367                          ;;**************************************************************
6368                          ;*THIS ROUTINE WILL CONVERT A 32-BIT UNSIGNED BINARY NUMBER TO AN
6369                          ;*UNSIGNED OCTAL ASCIZ NUMBER.
6370                          ;*CALL
6371                          ;*      MOV     #PNTR,-(SP)     ;;POINTER TO LOW WORD OF BINARY NUMBER
6372                          ;*      JSR     PC,@#$DB20      ;;CALL THE ROUTINE
6373                          ;*      RETURN                  ;;THE ADDRESS OF THE FIRST ASCIZ CHAR. IS ON THE STACK
6374
6375
6376  042736  104406                $DB20:    SAVREG                  ;;SAVE ALL REGISTERS
6377  042740  016601  000002                  MOV     2(SP),R1        ;;PICKUP THE POINTER TO LOW WORD
6378  042744  012705  043055                  MOV     #$OCTVL+13.,R5  ;;POINTER TO DATA TABLE
6379  042750  012704  000014                  MOV     #12.,R4         ;;DO ELEVEN CHARACTERS
6380  042754  012703  177770                  MOV     #^C7,R3         ;;MASK
6381  042760  012100                          MOV     (R1)+,R0        ;;LOWER WORD
6382  042762  012101                          MOV     (R1)+,R1        ;;HIGH WORD
6383  042764  005002                          CLR     R2              ;;TERMINATOR
6384  042766  110245                1$:       MOVB    R2,-(R5)        ;;PUT CHARACTER IN DATA TABLE
6385  042770  010002                          MOV     R0,R2           ;;GET THIS DIGIT
6386  042772  005304                          DEC     R4              ;;COUNT THIS CHARACTER
6387  042774  003007                          BGT     3$              ;;BR IF NOT THE LAST DIGIT
6388  042776  001405                          BEQ     2$              ;;BR IF IT IS THE LAST DIGIT
6389  043000  005205                          INC     R5              ;;ALL DIGITS DONE-ADJUST POINTER FOR FIRST
6390  043002  010566  000002                  MOV     R5,2(SP)        ;;ASCIZ CHAR. & PUT IT ON THE STACK
6391  043006  104407                          RESREG                  ;;RESTORE ALL REGISTERS
6392  043010  000207                          RTS     PC              ;;RETURN TO USER
6393  043012  006203                2$:       ASR     R3              ;;POSITION THE MASK FOR THE LAST DIGIT
6394  043014  006001                3$:       ROR     R1              ;;POSITION THE BINARY NUMBER FOR
6395  043016  006000                          ROR     R0              ;;       THE NEXT OCTAL DIGIT
6396  043020  006001                          ROR     R1
6397  043022  006000                          ROR     R0
6398  043024  006001                          ROR     R1
6399  043026  006000                          ROR     R0
6400  043030  040302                          BIC     R3,R2           ;;MASK OUT ALL JUNK
6401  043032  062702  000060                  ADD     #'0,R2          ;;MAKE THIS CHAR. ASCII
```

```
                        BR      1$                      ;;GO PUT IT IN THE DATA TABLE
043040  000016  $OCTVL: .BLKB   14.                     ;;RESERVE DATA TABLE

                .SBTTL  SCOPE HANDLER ROUTINE

                ;;**********************************************************************
                ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
                ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
                ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
                ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
                ;*SW14=1         LOOP ON TEST
                ;*SW11=1         INHIBIT ITERATIONS
                ;*SW09=1         LOOP ON ERROR
                ;*SW08=1         LOOP ON TEST IN SWR<6:0>
                ;*CALL
                ;*      SCOPE           ;;SCOPE=IOT

043056          $SCOPE:
043056  005037  001442          CLR     RETRY           ;CLEAR THE RETRY FLAG BEFORE THIS TEST
043062  005037  001430          CLR     ERRCNT          ;CLEAR THE MULTIPLE ERROR COUNTER
043066  032777  040000  136044  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
043074  001117                  BNE     $OVER           ;;YES IF SW14=1
                        ;#####START OF CODE FOR THE XOR TESTER#####
043076  000416          $XTSTR: BR      6$              ;;IF RUNNING ON THE "XOR" TESTER CHANGE
                                                        ;;THIS INSTRUCTION TO A "NOP" (NOP=240)
043100  013746  000004          MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
043104  012737  043124  000004  MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
043112  005737  177060          TST     @#177060        ;;TIME OUT ON XOR?
043116  012637  000004          MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
043122  000466                  BR      $SVLAD          ;;GO TO THE NEXT TEST
043124  022626          5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
043126  012637  000004          MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
043132  000426                  BR      7$              ;;LOOP ON THE PRESENT TEST
043134                  6$:;#####END OF CODE FOR THE XOR TESTER#####
043134  032777  000400  135776  BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
043142  001407                  BEQ     2$              ;;BR IF NO
043144  017746  135770          MOV     @SWR,-(SP)      ;;SET DESIRED TEST NUM. FROM SWR
043150  042716  000200          BIC     #$SWRMK,(SP)    ;;STRIP AWAY UNDESIRED BITS
043154  122637  001102          CMPB    (SP)+,$TSTNM    ;;ON THE RIGHT TEST?
043160  001465                  BEQ     $OVER           ;;BR IF YES
043162  105737  001103  2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
043166  001421                  BEQ     3$              ;;BR IF NO
043170  123737  001115  001103  CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
043176  101015                  BHI     3$              ;;BR IF NO
043200  032777  001000  135732  BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
043206  001404                  BEQ     4$              ;;BR IF NO
043210  013737  001110  001106  7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
043216  000446                  BR      $OVER
043220  105037  001103  4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
043224  005037  001212          CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
043230  000415                  BR      1$              ;;ESCAPE TO THE NEXT TEST
043232  032777  004000  135700  3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
043240  001011                  BNE     1$              ;;BR IF YES
043242  005737  001234          TST     $PASS           ;;IF FIRST PASS OF PROGRAM
043246  001406                  BEQ     1$              ;;      INHIBIT ITERATIONS
043250  005237  001104          INC     $ICNT           ;;INCREMENT ITERATION COUNT
```

```
6458  043254  023737  001212  001104          CMP     $TIMES,$ICNT    ;;CHECK THE NUMBER OF ITERATIONS MADE
6459  043262  002024                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
6460  043264  012737  000001  001104  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
6461  043272  013737  043350  001212          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
6462  043300  105237  001102          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
6463  043304  113737  001102  001232          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
6464  043312  011637  001106                  MOV     (SP),,$LPADR    ;;SAVE SCOPE LOOP ADDRESS
6465  043316  011637  001110                  MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
6466  043322  005037  001214                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
6467  043326  112737  000001  001115          MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
6468  043334  013777  001102  135600  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
6469  043342  013716  001106                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
6470  043346  000002                          RTI                     ;;FIXES PS
6471  043350  000310                  $MXCNT: 200.                    ;;MAX. NUMBER OF ITERATIONS
6472                                  .SBTTL  ERROR HANDLER ROUTINE
6473
6474                                  ;;**************************************************************
6475                                  ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
6476                                  ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
6477                                  ;*AND GO TO ERTYPE ON ERROR
6478                                  ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
6479                                  ;*SW15=1         HALT ON ERROR
6480                                  ;*SW13=1         INHIBIT ERROR TYPEOUTS
6481                                  ;*SW10=1         BELL ON ERROR
6482                                  ;*SW09=1         LOOP ON ERROR
6483                                  ;*CALL
6484                                  ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
6485
6486  043352                          $ERROR:
6487  043352  113737  001102  001412          MOVB    $TSTNM,TESTNO   ;SAVE TEST NUMBER FOR ERROR TYPE OUT
6488  043360  005237  001430                  INC     ERRCNT          ;KEEP COUNT OF MULTIPLE ERRORS
6489  043364  010037  001162                  MOV     R0,$REG0        ;SAVE R0
6490  043370  010137  001164                  MOV     R1,$REG1        ;SAVE R1
6491  043374  010237  001166                  MOV     R2,$REG2        ;SAVE R2
6492  043400  010337  001170                  MOV     R3,$REG3        ;SAVE R3
6493  043404  010437  001172                  MOV     R4,$REG4        ;SAVE R4
6494  043410  010537  001174                  MOV     R5,$REG5        ;SAVE R5
6495  043414  105237  001103          7$:     INCB    $ERFLG          ;;SET THE ERROR FLAG
6496  043420  001775                          BEQ     7$              ;;DON'T LET THE FLAG GO TO ZERO
6497  043422  013777  001102  135512          MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER AND ERROR FLAG
6498  043430  032777  002000  135502          BIT     #BIT10,@SWR     ;;BELL ON ERROR?
6499  043436  001402                          BEQ     1$              ;;NO - SKIP
6500  043440  104401  001216                  TYPE    ,$BELL          ;;RING BELL
6501  043444  005237  001112          1$:     INC     $ERTTL          ;;COUNT THE NUMBER OF ERRORS
6502  043450  011637  001116                  MOV     (SP),$ERRPC     ;;GET ADDRESS OF ERROR INSTRUCTION
6503  043454  162737  000002  001116          SUB     #2,$ERRPC
6504  043462  117737  135430  001114          MOVB    @$ERRPC,$ITEMB  ;;STRIP AND SAVE THE ERROR ITEM CODE
6505  043470  032777  020000  135442          BIT     #BIT13,@SWR     ;;SKIP TYPEOUT IF SET
6506  043476  001004                          BNE     20$             ;;SKIP TYPEOUTS
6507  043500  004737  043650                  JSR     PC,ERTYPE       ;;GO TO USER ERROR ROUTINE
6508  043504  104401  001223                  TYPE    ,$CRLF
6509  043510                          20$:
6510  043510  122737  000001  001246          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
6511  043516  001007                          BNE     2$              ;;NO,SKIP APT ERR ? REPORT
6512  043520  113737  001114  043532          MOVB    $ITEMB,21$      ;;SET ITEM NUMBER AS ERROR NUMBER
6513  043526  004737  041510                  JSR     PC,$ATY4        ;;REPORT FATAL ERROR TO APT
```

```
6514  043532  000                    21$:    .BYTE   0
6515  043533  000                            .BYTE   0
6516  043534  000777                 22$:    BR      22$             ;;APT ERROR LOOP
6517  043536  005777  135376         2$:     TST     @SWR            ;;HALT ON ERROR
6518  043542  100001                         BPL     3$              ;;SKIP IF CONTINUE
6519  043544  000000                         HALT                    ;;HALT ON ERROR!
6520  043546  032777  001000  135364 3$:     BIT     #BIT09,@SWR     ;;LOOP ON ERROR SWITCH SET?
6521  043554  001402                         BEQ     4$              ;;BR IF NO
6522  043556  013716  001110                 MOV     $LPERR,(SP)     ;;FUDGE RETURN FOR LOOPING
6523  043562  005737  001214         4$:     TST     $ESCAPE         ;;CHECK FOR AN ESCAPE ADDRESS
6524  043566  001402                         BEQ     5$              ;;BR IF NONE
6525  043570  013716  001214                 MOV     $ESCAPE,(SP)    ;;FUDGE RETURN ADDRESS FOR ESCAPE
6526  043574                         5$:
6527  043574  022737  041034  000042         CMP     #$ENDAD,@#42    ;;ACT-11 AUTO-ACCEPT?
6528  043602  001001                         BNE     6$              ;;BRANCH IF NO
6529  043604  000000                         HALT                    ;;YES
6530  043606                         6$:
6531  043606  032737  001000  001140         BIT     #SW9,SWR        ;IS THE LOOP ON ERROR SWITCH UP?
6532  043614  001414                         BEQ     EREXIT          ;BRANCH IF NOT LOOPING ON ERROR
6533  043616  042737  177776  177572         BIC     #177776,MMR0    ;CLEAR MEMORY MANAGEMENT REG 0
6534                                                                 ;LEAVE BIT0 UNCHANGED
6535  043624  012737  177777  015162         MOV     #-1,CPFLAG      ;RE-INITIALIZE CP TRAP FLAG
6536  043632  012737  177777  015252         MOV     #-1,PAFLAG      ;RE-INITIALIZE PARITY TRAP FLAG
6537  043640  012737  177777  015432         MOV     #-1,MMFLAG      ;RE-INITIALIZE MEMORY MANAGE. TRAP FLAG
6538  043646  000002                 EREXIT: RTI                     ;RETURN TO TEST AFTER ERROR
6539
6540
6541                                 .SBTTL  ERROR MESSAGE TYPE OUT ROUTINE
6542
6543
6544                                 ;*      THIS SUBROUTINE IS CALLED BY THE ERROR HANDLER TO TYPE
6545                                 ;*      THE ERROR MESSAGES.  IT PICKS UP THE ITEM BYTE ($ITEMB) NUMBER
6546                                 ;*      AND USES THAT TO INDEX THROUGH THE ERROR TABLE.  THE ERROR
6547                                 ;*      TABLE STARTS AT "$ERRTB" AND HAS FOUR (4) POINTERS FOR EACH
6548                                 ;*      ENTRY, 'EM', 'DH', 'DT', 'DF'.  THE 'EM' POINTS TO THE ERROR
6549                                 ;*      MESSAGE WHICH IS AN ASCIZ STRING.  THE 'DH' POINTS TO THE DATA
6550                                 ;*      HEADER WHICH IS ANOTHER ASCIZ STRING.  THE 'DT' POINTS TO THE
6551                                 ;*      DATA TABLE WHICH IS A GROUP OF WORDS CONTAINING THE ADDRESSES
6552                                 ;*      OF THE DATA TO BY TYPED.  THE FORMAT OF THIS DATA IS
6553                                 ;*      CONTROLLED BY THE 'DF' WHICH IS THE POINTER TO THE DATA FORMAT.
6554                                 ;*      THE DATA FORMAT IS A GROUP OF BYTES WHICH CONTAIN NUMBERS
6555                                 ;*      THAT CORRESPOND TO DIFFERENT TYPING FORMATS.
6556                                 ;*      0       -16 BIT OCTAL FORMAT
6557                                 ;*      1       -DECIMAL FORMAT
6558                                 ;*      2       -18 BIT OCTAL FORMAT.  DATA IS A P.A.R. AND THE
6559                                 ;*               OUTPUT IS THE BASE ADDRESS THAT THE P.A.R. POINTS TO.
6560  043650  010046                 ERTYPE: MOV     R0,-(KSP)       ;SAVE R0 ON STACK
6561  043652  005000                         CLR     R0              ;CLEAR R0
6562  043654  113700  001114                 MOVB    @#$ITEMB,R0     ;PUT ITEM NUMBER IN R0
6563  043660  001004                         BNE     1$              ;BRANCH IF IT IS NON-ZERO
6564  043662  013746  001116                 MOV     $ERRPC,-(KSP)   ;PUT ERROR PC ON STACK FOR TYPING
6565  043666  104402                         TYPOC                   ;TYPE FAILING PC
6566  043670  000534                         BR      13$             ;GO TO RETURN
6567  043672  104401  001223         1$:     TYPE    ,$CRLF          ;TYPE CRLF
6568  043676  005300                         DEC     R0              ;ADJUST ITEM NUMBER TO BE A POINTER
6569  043700  006300                         ASL     R0              ;LEFT SHIFT ITEM NO. 3 PLACES
```

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6570  043702  006300                        ASL     R0
6571  043704  006300                        ASL     R0
6572  043706  100024                        BPL     22$             ;BRANCH IF ITEM #LESS THAN 200
6573  043710  032700  001000                BIT     #BIT9,R0        ;SEE IF ITEM # WAS 3XX
6574  043714  001415                        BEQ     21$             ;BRANCH IF ITEM # WAS 2XX
6575                                                                ;AND TYPE ERROR MESSAGE
6576  043716  032737  000200  001140        BIT     #SW7,@#SWR      ;SEE IF SWITCH 7 IS UP
6577  043724  001404                        BEQ     20$             ;BRANCH IF SWITCH IS NOT UP
6578                                                                ;AND TYPE DATA, ON MULTIPLE ERRORS
6579  043726  062766  000004  000002        ADD     #4,2(KSP)       ;SKIP 'TYPE ,$CRLF' IF SW 7 IS UP
6580                                                                ;INHIBIT MULTIPLE ERROR TYPEOUTS
6581  043734  000512                        BR      13$             ;BRANCH TO EXIT
6582  043736                          20$:
6583  043736  042700  177000                BIC     #177000,R0      ;CLEAR UPPER BYTE OF R0
6584  043742  062700  002472                ADD     #ER200+4,R0     ;POINT TO DATA TABLE ENTRY
6585  043746  000424                        BR      5$              ;GO TYPE DATA TABLE
6586  043750  042700  177000          21$:  BIC     #177000,R0      ;CLEAR UPPER BYTE OF R0
6587  043754  062700  000770                ADD     #<ER200-$ERRTB>,R0 ;ADD DIFFERENCE BETWEEN
6588                                                                ;ITEM 1 AND ITEM 201
6589                                  ;;                    GET POINTER TO ERROR MESSAGE AND TYPE IT
6590                                  ;;                    IF THE POINTER IS NOT ZERO
6591  043760  062700  001476          22$:  ADD     #$ERRTB,R0      ;ADD BASE OF ERROR TABLE
6592  043764  012037  043774                MOV     (R0)+,2$        ;PUT MESSAGE POINTER IN TYPE STATEMENT
6593  043770  001404                        BEQ     3$              ;BRANCH IF NO ERROR MESSAGE
6594  043772  104401                        TYPE                    ;TYPE ERROR MESSAGE
6595  043774  000000                  2$:   .WORD   0               ;POINTER TO ERROR MESSAGE
6596  043776  104401  001223                TYPE    ,$CRLF          ;TYPE CRLF
6597                                  ;;                    GET THE POINTER TO THE DATA HEADER AND
6598                                  ;;                    TYPE IT IF THE POINTER IS NOT ZERO
6599  044002  012037  044012          3$:   MOV     (R0)+,4$        ;PUT HEADER POINTER IN TYPE STATEMENT
6600  044006  001404                        BEQ     5$              ;BRANCH IF NO DATA HEADER
6601  044010  104401                        TYPE                    ;TYPE THE DATA HEADER
6602  044012  000000                  4$:   .WORD   0               ;POINTER TO DATA HEADER
6603  044014  104401  001223                TYPE    ,$CRLF          ;TYPE CRLF
6604                                  ;;                    THIS IS THE START OF THE DATA OUTPUT IF THE
6605                                  ;;                    DATA POINTER IS NOT ZERO.  R0 POINTS TO THE
6606                                  ;;                    DATA FORMAT, R1 POINTS TO THE ADDRESS OF
6607                                  ;;                    THE DATA WORDS.
6608  044020  010146          5$:   MOV     R1,-(KSP)       ;SAVE R1 ON THE STACK
6609  044022  012001                MOV     (R0)+,R1        ;PUT DATA TABLE POINTER IN R1
6610  044024  001455                BEQ     12$             ;BRANCH IF NO DATA TABLE
6611  044026  012000                MOV     (R0)+,R0        ;PICK UP DATA FORMAT POINTER
6612  044030  105710          6$:   TSTB    (R0)            ;IS THIS WORD OCTAL
6613  044032  001003                BNE     7$              ;BRANCH IF NOT 16-BIT OCTAL
6614                                  ;;                    THIS IS 16 BIT OCTAL FORMAT (DF = 0)
6615  044034  013146                MOV     @(R1)+,-(KSP)   ;PUT WORD ON STACK FOR TYPING
6616  044036  104402                TYPOC                   ;TYPE THE WORD ON STACK AS 16 BIT OCTAL
6617  044040  000441                BR      11$             ;GET READY FOR NEXT WORD
6618  044042  122710  000001    7$:   CMPB    #1,(R0)         ;IS THE WORD DECIMAL
6619  044046  001003                BNE     10$             ;BRANCH IF NOT DECIMAL
6620                                  ;;                    THIS IS DECIMAL FORMAT (DF = 1)
6621  044050  013146                MOV     @(R1)+,-(KSP)   ;PUT WORD ON STACK FOR TYPING
6622  044052  104405                TYPDS                   ;TYPE THE WORD ON STACK AS DECIMAL
6623  044054  000433                BR      11$             ;GET READY FOR NEXT WORD
6624                                  ;;                    THIS IS FORMAT 2.  DATA WORD IS A P.A.R.
6625                                  ;;                    OUTPUT WILL BE 18-BIT. PAR LEFT SHIFTED 2.
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6626  044056  010246          10$:    MOV     R2,-(KSP)       ;SAVE R2 ON THE STACK
6627  044060  010346                  MOV     R3,-(KSP)       ;SAVE R3 ON THE STACK
6628  044062  013103                  MOV     @(R1)+,R3       ;LOAD DATA WORD INTO R3
6629  044064  005002                  CLR     R2              ;R2 WILL HOLD UPPER SIX BITS OF NUMBER
6630  044066  012705  000006          MOV     #6,R5           ;LEFT SHIFT <R2:R3> 6 PLACES
6631  044072  000241          23$:    CLC
6632  044074  006303                  ASL     R3
6633  044076  006102                  ROL     R2
6634  044100  077504                  SOB     R5,23$
6635  044102  010237  001372          MOV     R2,PADRSH       ;STORE UPPER BITS OF ADDRESS
6636  044106  010337  001370          MOV     R3,PADRSL       ;STORE LOWER 16 BITS OF ADDRESS
6637  044112  012746  001370          MOV     #PADRSL,-(KSP)  ;PUT ADDRESS OF LOWER 16 BITS ON STACK
6638  044116  004737  042736          JSR     PC,$DB2O        ;CONVERT TWO WORDS TO ASCIZ
6639  044122  062716  000005          ADD     #5,(KSP)        ;I ONLY WANT 6 DIGITS
6640  044126  012637  044134          MOV     (KSP)+,31$      ;PUT POINTER AFTER TYPE CALL
6641  044132  104401                  TYPE                    ;POINTER TO ASCIZ STRING FOLLOWS
6642  044134  000000          31$:    .WORD   0               ;POINTER TO ASCIZ STRING
6643  044136  012603                  MOV     (KSP)+,R3       ;RESTORE R3 FROM STACK
6644  044140  012602                  MOV     (KSP)+,R2       ;RESTORE R2 FROM STACK
6645  044142  000400                  BR      11$             ;GET READY FOR NEXT WORD
6646  044144  005200          11$:    INC     R0              ;POINT TO NEXT FORMAT BYTE
6647  044146  104401  044166          TYPE    ,32$            ;TYPE TWO SPACES
6648  044152  005711                  TST     (R1)            ;IS THERE ANOTHER WORD?
6649  044154  001401                  BEQ     12$             ;BRANCH IF ALL DONE
6650  044156  000724                  BR      6$              ;GO BACK FOR NEXT NUMBER
6651  044160  012601          12$:    MOV     (KSP)+,R1       ;RESTORE R1
6652  044162  012600          13$:    MOV     (KSP)+,R0       ;RESTORE R0
6653  044164  000207                  RTS     PC              ;RETURN TO ERROR ROUTINE
6654  044166  020040  000     32$:    .ASCIZ  ?  ?            ;TWO SPACES
6655          044172                  .EVEN
6656
6657
6658
6659
6660
6661                          .SBTTL  ************** SUBROUTINES UNIQUE TO THIS PROGRAM ***************
6662
6663
6664
6665
6666
6667
6668                          .SBTTL  TURN OFF AND SAVE THE T-BIT
6669                          ;*
6670                          ;*      THIS SUBROUTINE IS REACHED BY THE TRAP CALL "TBITO".  IT IS
6671                          ;*      USED TO TURN OFF THE T-BIT IF IT IS ON.  THE PROCESSOR STATUS
6672                          ;*      IS SAVED IN "OLDPSW" SO THAT THE T-BIT CAN BE RESTORED TO ITS
6673                          ;*      PREVIOUS STATUS WHEN CONDITIONS WARRANT
6674                          ;*
6675                          .EQUIV  BIT4,TBIT
6676  044172                  TBITOFF:
6677  044172  032766  000020  000002          BIT     #TBIT,2(KSP)    ;IS THE T-BIT ON?
6678  044200  001406                          BEQ     1$              ;BRANCH IF ITS NOT
6679  044202  016637  000002  001440          MOV     2(KSP),OLDPSW   ;SAVE OLD PSW FOR RESTORING LATER
6680  044210  042766  000020  000002          BIC     #TBIT,2(KSP)    ;CLEAR THE T-BIT
6681  044216  000006                  1$:     RTT                     ;RETURN TO THE PROGRAM
```

```
6682
6683
6684                                    .SBTTL  RESTORE T-BIT TO ITS PREVIOUS CONDITION
6685                                    ;*
6686                                    ;*      THIS SUBROUTINE IS REACHED BY THE TRAP CALL "TBITR", IT IS
6687                                    ;*      USED TO RESTORE THE T-BIT AFTER A PARTICULAR TEST THAT
6688                                    ;*      CANNOT BE RUN WITH THE T-BIT ON.  IT USES THE PROCESSOR
6689                                    ;*      STATUS STORED IN "OLDPSW" BY "TBITO", REPLACES THE PS ON THE
6690                                    ;*      STACK WITH IT AND DOES AN "RTT".
6691                                    ;*
6692  044220                            TBITRESTORE:
6693  044220  013766  001440  000002            MOV     OLDPSW,2(KSP)   ;PUT OLD PSW ON THE STACK
6694  044226  042737  000020  001440            BIC     #TBIT,OLDPSW    ;CLEAR T-BIT IN "OLDPSW" SO THAT IT
6695                                                                    ;WON'T BE TURNED ON BY ACCIDENT
6696  044234  000006                            RTT                     ;RETURN TO PROGRAM AND INHIBIT T-BIT
6697                                                                    ;TRAPPING AFTER THIS INSTRUCTION
6698
6699
6700                                    .SBTTL  CLEAR 8 PARS OR PDRS STARTING FROM ADDRESS IN R5
6701                                    ;;**********************************************************************
6702                                    ;*      SUBROUTINE CLRREG
6703                                    ;*
6704                                    ;*      THIS SUBROUTINE CLEARS 8 CONSECUTIVE MEMORY MANAGEMENT
6705                                    ;*      REGISTERS STARTING WITH THE REGISTER POINTED TO BY R5.
6706                                    ;*      IT SAVES R0 ON THE STACK AND LOADS A COUNT IN R0,
6707                                    ;*      CLEARS THE PAR'S OR PDR'S, AND THEN RESTORES R0 BEFORE
6708                                    ;*      RETURNING.
6709                                    ;*      THE CALLING SEQUENCE IS:
6710                                    ;*      MOV     #KIPAR0,R5      ;PUT ADDRESS OF FIRST KERNEL PAR IN R5
6711                                    ;*      JSR     PC,CLRREG       ;GO CLEAR ALL KERNEL PAR'S
6712                                    ;*
6713                                    ;;**********************************************************************
6714
6715  044236  010046                    CLRREG: MOV     R0,-(KSP)       ;SAVE R0 ON STACK
6716  044240  012700  000010                    MOV     #10,R0          ;PUT COUNT IN R0
6717  044244  005025                    1$:     CLR     (R5)+           ;CLEAR PAR ORPDR POINTED TO BY R5
6718  044246  077002                            SOB     R0,1$           ;BRANCH BACK 7 DECIMAL TIMES.
6719  044250  012600                            MOV     (KSP)+,R0       ;RESTORE R0 FROM STACK
6720  044252  000207                            RTS     PC              ;RETURN TO TEST
6721
6722                                    .SBTTL  CLEANUP LOCATIONS THAT HOLD LOGICAL 'AND' AND 'OR'
6723                                    ;;**********************************************************************
6724                                    ;*      SUBROUTINE CLEANUP
6725                                    ;*
6726                                    ;*      THIS SUBROUTINE IS USED TO INITIALIZE ALL THE LOCATIONS THAT
6727                                    ;*      HOLD THE "LOGICAL AND" AND "LOGICAL OR" OF THE DATA AND ADDRESSES
6728                                    ;*      THAT FAILED DURING THE EXECUTION OF A TEST.
6729                                    ;*
6730                                    ;;**********************************************************************
6731
6732  044254                            CLEANUP:                        ;STARTING ADDRESS OF SUBROUTINE.
6733  044254  005037  001414                    CLR     DATAOR          ;LOCATION FOR LOGICAL OR OF BAD DATA
6734  044260  005037  001424                    CLR     ADDROR          ;LOCATION FOR LOGICAL OR OF ADDRESS
6735  044264  005037  001420                    CLR     PATTOR          ;LOCATION FOR LOGICAL OR OF PATTERN LOADED
6736  044270  012700  177777                    MOV     #-1,R0          ;LOAD -1 INTO R0 TO INITIALIZE LOGICAL AND LOCS
6737  044274  010037  001416                    MOV     R0,DATAND       ;LOCATION FOR LOGICAL AND OF BAD DATA
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6738  044300  010037  001426          MOV     R0,ADRAND       ;LOCATION FOR LOGICAL AND OF ADDRESS
6739  044304  010037  001422          MOV     R0,PATAND       ;LOCATION FOR LOGICAL AND OF PATTERN LOADED
6740  044310  000207                  RTS     PC              ;RETURN TO TEST
6741
6742                                  .SBTTL  P.A.R. OR P.D.R. ADDRESS TIMED OUT WHEN REFERENCED
6743                                  ;;**********************************************************************
6744                                  ;*
6745                                  ;*      THIS SUBROUTINE IS USED TO LOG AND REPORT THE FACT THAT A
6746                                  ;*      REFERENCE TO A P.A.R. OR A P.D.R. TIMED OUT ON THE UNIBUS.  IT
6747                                  ;*      KEEPS A LOGICAL AND AND A LOGICAL OR OF EACH ADDRESS THAT TIMES
6748                                  ;*      OUT.
6749                                  ;;**********************************************************************
6750  044312                          TIMEOUT:                        ;STARTING ADDRESS OF SUBROUTINE
6751  044312  005227                          INC     (PC)+           ;INCREMENT ONE TIME GATE
6752  044314  177777                  TOFLAG: .WORD   -1              ;ONE TIME ENTANCE FLAG
6753  044316  001401                          BEQ     10$             ;BRANCH IF FLAG IS NOW ZERO
6754  044320  000000                          HALT                    ;I HAVE ENTERED THIS ROUTINE BEFORE
6755                                                                  ;I FINISHED REPORTING THE FIRST ERROR
6756                                                                  ;THE SECOND ENTRY ADDRESS IS ON THF
6757                                                                  ;STACK AND THE FIRST ERROR CONDITION
6758                                                                  ;IS PROBABLY STILL LOCKED UP .
6759  044322  012637  001434          10$:    MOV     (KSP)+,OLDPC    ;SAVE RETURN ADDRESS
6760  044326  012637  001436                  MOV     (KSP)+,OLDPS    ;SAVE OLD PSW
6761  044332  012706  001100                  MOV     #KERSTK,KSP     ;RESTORE STACK POINTER
6762  044336  050037  001424          1$:     BIS     R0,ADDROR       ;PERFORM LOGIAL OR OF FAILING ADDRESS
6763  044342  005100                          COM     R0              ;GET R0 READY FOR AND
6764  044344  040037  001426                  BIC     R0,ADRAND               ;PERFORM LOGICAL AND
6765  044350  005100                          COM     R0              ;PUT R0 BACK AS IT WAS
6766  044352  105737  001103                  TSTB    $ERFLG          ;IS THIS THE FIRST ERROR
6767  044356  001002                          BNE     2$              ;BRANCH IF NOT FIRST ERROR
6768  044360  104201                          ERROR   201             ;NO REGISTER RESPONSE.
6769  044362  000401                          BR      3$              ;BRANCH TO EXIT
6770  044364  104301                  2$:     ERROR   301             ;CONTINUE NO RESPONSE TABLE
6771  044366  012737  177777  044314  3$:     MOV     #-1,TOFLAG      ;RESET ONE TIME GATE
6772  044374  013746  001436                  MOV     OLDPS,-(KSP)    ;RESTORE OLD PSW
6773  044400  013746  001434                  MOV     OLDPC,-(KSP)    ;PUSH RETURN ADDRESS BACK ON THE STACK
6774  044404  000006                          RTT                     ;RETURN TO THE TEST
6775
6776                                  .SBTTL  DUAL ADDRESSING WHEN LOADING A P.A.R. OR P.D.R.
6777                                  ;;**********************************************************************
6778                                  ;*
6779                                  ;*      THIS SUBROUTINE WILL LOG AND REPORT ALL DUAL ADDRESSING ERRORS
6780                                  ;*      FOUND IN BOTH P.A.R.'S AND P.D.R.'S.  A "LOGICAL OR" AND A
6781                                  ;*      "LOGICAL AND" OF THE WRITTEN ADDRESSES WILL BE MAINTAINED IN
6782                                  ;*      'ADDROR' AND 'ADRAND'.  THE LOG ON THE ADDITIONAL OR FAILING,
6783                                  ;*      ADDRESSES WILL BE MAINTAINED IN 'DATAOR' AND 'DATAND'.
6784                                  ;*
6785                                  ;;**********************************************************************
6786  044406                          DUALADR:                        ;STARTING LOCATION OF SUBROUTINE
6787  044406  012637  001434                  MOV     (KSP)+,OLDPC    ;SAVE RETURN ADDRESS IN CASE OF LOOP
6788  044412  050037  001424                  BIS     R0,ADDROR       ;LOGICAL OR OF WRITTEN ADDRESS
6789  044416  005100                          COM     R0              ;GET R0 READY FOR AND
6790  044420  040037  001426                  BIC     R0,ADRAND               ;PERFORM LOGICAL AND
6791  044424  005100                          COM     R0              ;PUT R0 BACK AS IT WAS
6792  044426  050137  001414                  BIS     R1,DATAOR       ;LOGICAL OR OF DUALED ADDRESS
6793  044432  005101                          COM     R1              ;GET R1 READY FOR AND
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6794   044434  040137  001416          BIC     R1,DATAND               ;PERFORM LOGICAL AND
6795   044440  005101                  COM     R1              ;PUT R1 BACK AS IT WAS
6796   044442  105737  001103          TSTB    $ERFLG          ;SEE IF THIS IS FIRST ERROR
6797   044446  001002                  BNE     1$              ;BRANCH IF NOT FIRST ERROR
6798   044450  104202                  ERROR   202
6799   044452  000401                  BR      2$              ;BRANCH TO EXIT
6800   044454  104302          1$:     ERROR   302
6801   044456  000177  134752  2$:     JMP     @OLDPC          ;RETURN TO TEST
6802
6803
6804                           .SBTTL  COUNT PATTERN ERRORS IN P.A.R.'S OR P.D.R.'S
6805                           ;;**************************************************************************
6806                           ;*
6807                           ;*      THIS SUBROUTINE IS USED TO LOG AND REPORT THE COUNT PATTERN
```

```
6808                    ;*      ERRORS OCCURRING WHEN TESTING THE P.A.R.'S AND P.D.R.'S.
6809                    ;*      THE "LOGICAL OR" AND "LOGICAL AND" OF VARIOUS DATA WILL BE
6810                    ;*      MAINTAINED AS FOLLOWS:
6811                    ;*      ADDRESSES OF FAILING REGISTERS IN 'ADDROR' AND 'ADRAND'
6812                    ;*      DATA FETCHED FROM REGISTERS IN 'DATAOR' AND 'DATAND'
6813                    ;*      PATTERN LOADED INTO THE REGISTERS IN 'PATTOR' AND 'PATAND'.
6814                    ;*
6815                    ;;*************************************************************************
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```
 6816  044462                          PARCOUNT:                       ;STARTING ADDRESS OF THIS SUBROUTINE
 6817  044462  012637  001434                  MOV     (KSP)+,OLDPC    ;SAVE RETURN ADDRESS IN CASE OF LOOP
 6818  044466  050037  001424                  BIS     R0,ADDROR       ;LOGICAL OR OF FAILING ADDRESS
 6819  044472  005100                          COM     R0              ;GET R0 READY FOR AND
 6820  044474  040037  001426                  BIC     R0,ADRAND               ;PERFORM LOGICAL AND
 6821  044500  005100                          COM     R0              ;PUT R0 BACK AS IT WAS
 6822  044502  050137  001420                  BIS     R1,FATTOR       ;LOGICAL OR OF PATTERN LOADED
 6823  044506  005101                          COM     R1              ,GET R1 READY FOR AND
 6824  044510  040137  001422                  BIC     R1,PATAND               ;PERFORM LOGICAL AND
 6825  044514  005101                          COM     R1              ;PUT R1 BACK AS IT WAS
 6826  044516  050237  001414                  BIS     R2,DATAOR       ;LOGICAL OR OF DATA FETCHED
 6827  044522  005102                          COM     R2              ;GET R2 READY FOR AND
 6828  044524  040237  001416                  BIC     R2,DATAND               ;PERFORM LOGICAL AND
 6829  044530  005102                          COM     R2              ;PUT R2 BACK AS IT WAS
 6830  044532  105737  001103                  TSTB    $ERFLG          ;SEE IF THIS IS THE FIRST ERROR
 6831  044536  001002                          BNE     1$              ;BRANCH IF NOT FIRST ERROR
 6832  044540  104203                          ERROR   203
 6833  044542  000401                          BR      2$              ;BRANCH TO EXIT
 6834  044544  104303                  1$:     ERROR   303
 6835  044546  000177  134662          2$:     JMP     @OLDPC          ;RETURN TO TEST
 6836
 6837
 6838
 6839
 6840
 6841          000001                  .END
```

```
ABASE = 000000            741     782
ACDW1 = 000000            741     784
ACDW2 = 000000            741     785
ACPUOP= 000000            741     756
ADDROR  001424            834*   2197    2201    2204    6734*   6762*   6788*   6818*
ADDW0 = 000000            741     786
ADDW1 = 000000            741     787
ADDW10= 000000            741     796
ADDW11= 000000            741     797
ADDW12= 000000            741     798
ADDW13= 000000            741     799
ADDW14= 000000            741     800
ADDW15= 000000            741     801
ADDW2 = 000000            741     788
ADDW3 = 000000            741     789
ADDW4 = 000000            741     790
ADDW5 = 000000            741     791
ADDW6 = 000000            741     792
ADDW7 = 000000            741     793
ADDW8 = 000000            741     794
ADDW9 = 000000            741     795
ADEVCT= 000000            741     747
ADEVM = 000000            741     783
ADRAND  001426            835*   2197    2201    2204    6738*   6764*   6790*   6820*
AENV  = 000000            741     752
AENVM = 000000            741     753
AFATAL= 000000            741     744
AMADR1= 000000            741     769
AMADR2= 000000            741     773
AMADR3= 000000            741     776
AMADR4= 000000            741     779
AMAMS1= 000000            741     763
AMAMS2= 000000            741     771
AMAMS3= 000000            741     774
AMAMS4= 000000            741     777
AMSGAD= 000000            741     749
AMSGLG= 000000            741     750
AMSGTY= 000000            741     743
AMTYP1= 000000            741     764
AMTYP2= 000000            741     772
AMTYP3= 000000            741     775
AMTYP4= 000000            741     778
APASS = 000000            741     746
APRIOR= 000000            741
APTCSU= 000040           6014    6119*
APTENV= 000001           6007    6075    6117*   6510
APTSIZ= 000200           2638    6116*
APTSPO= 000100           6009    6077    6118*
ASWREG= 000000            741     754
ATESTN= 000000            741     745
AUNIT = 000000            741     748
AUSWR = 000000            741     755
AVECT1= 000000            741     780
AVECT2= 000000            741     781
BADPC   001410            828*   2182    2183    2185    2187    2189    2397*   2436*   2481*
BITO  = 000001            524*   4132    4384    4484    4487    4565    4890    5006    5137    5205    5259    5327    5375
```

```
BIT00 = 000001            514#    524
BIT01 = 000002            513#    523
BIT02 = 000004            512#    522
BIT03 = 000010            511#    521
BIT04 = 000020            510#    520
BIT05 = 000040            509#    519
BIT06 = 000100            508#    518
BIT07 = 000200            507#    517
BIT08 = 000400            506#    516   6436
BIT09 = 001000            505#    515   6446   6520
BIT1  = 000002            523#
BIT10 = 002000            504#   6498
BIT11 = 004000            503#   6453
BIT12 = 010000            502#   4473   4476   4952   5923
BIT13 = 020000            501#   6505
BIT14 = 040000            500#   6422
BIT15 = 100000            499#   2915
BIT2  = 000004            522#   4526   4721   4723   4728   4731   4734
BIT3  = 000010            521#
BIT4  = 000020            520#   4037   4085   4345   4347   4661   6675
BIT5  = 000040            519#
BIT6  = 000100            518#   5007
BIT7  = 000200            517#
BIT8  = 000400            516#   3821   3836   3851   3866   3881   3896   3911   3926   3941   3956   3977   3991
BIT9  = 001000            515#   6573
BPTVEC= 000014            531#
CACHVE= 000114            607#   2672*  2673*
CLEANU  044254   2676     3039   3071   3102   3134   3176   3237   3297   3358   3429   3474   3516   3559
                 6732#
CLRREG  044236   3179     3195   3240   3256   3300   3316   3361   3377   3797   3799   3801   3803   6715#
CLRUW   040570   2663     5845#
CONTRL  001352    807#    2434   2437   2577*  2660*
CPFLAG  015162   2388#    2404*  2665*  6535*
CPUER   015160   2387#    2670   2731   3048   3080   3111   3143   4079   4562   4777
CPUERR= 177766    620#    2402   2724   2725   4087   4355   4525
CPUEXP  001362    815#    2668*
CR    = 000015    439#    6053   6063
CRLF  = 000200    440#     606#  1323   1337   1600   1820   1833   1842   1883   1947   1958   1981   2025
                 2033     2039   2043   2055   2162   2651   6024   6063
DATAND  001416    831#    2201   2204   6737*  6794*  6828*
DATAOR  001414    830#    2201   2204   6733*  6792*  6826*
DDISP = 177570    446#     708   2626
DF1     014656    895     1281   2279#
DF11    014704    947     2288#
DF12    014710    953     2290#
DF13    014714    959     2292#
DF14    014721    965     2294#
DF15    014725    972     2296#
DF16    014734    978     2299#
DF17    014745    984     2302#
DF2     014660    901     2230#
DF20    014752    990     2304#
DF201   015142   1293     23
DF202   015145   1302     2
DF203   015151   1310     
DF21    014755    996             2305#
```

```
DF22    014761            1002    2307#
DF23    014766            1008    1020    1026    2309#
DF27    014773            1032    2311#
DF3     014663             908     915    2281#
DF30    014776            1039    2312#
DF31    015003            1046    2314#
DF32    015012            1052    2317#
DF33    015016            1059    2319#
DF34    015025            1065    2322#
DF35    015030            1071    1077    2323#
DF37    015034            1083    1089    1149    1221    2325#
DF41    015041            1095    1101    1107    1113    1119    1125    2327#
DF47    015045            1136    2329#
DF5     014670             922    2283#
DF50    015054            1143    2332#
DF52    015062            1155    2334#
DF53    015066            1161    2336#
DF54    015072            1167    2338#
DF55    015076            1173    1179    1185    1191    1197    2340#
DF6     014674             929    2285#
DF62    015101            1203    2341#
DF63    015105            1209    2343#
DF64    015111            1215    2345#
DF66    015115            1227    1245    2347#
DF67    015121            1233    2349#
DF7     014701             935     941    2287#
DF70    015125            1239    2351#
DF72    015130            1251    1257    2352#
DF74    015133            1263    2353#
DF75    015135            1269    1275    2354#
DH1     007753             893    1279    1811#
DH11    010360             945    1858#
DH12    010420             951    1864#
DH13    010460             957    1870#
DH14    010531             963    1877#
DH15    010571             969    1883#
DH16    010720             976    1899#
DH17    011027             982    1911#
DH2     007776             899    1815#
DH20    011077             988    1918#
DH201   013536            1289    2158#
DH202   013565            1297    2162#
DH203   013645            1306    2171#
DH21    011127             994    1012    1923#
DH22    011167            1000    1929#
DH23    011236            1006    1018    1024    1936#
DH27    011306            1030    1943#
DH3     010032             905     912    1820#
DH30    011336            1036    1947#
DH31    011436            1043    1958#
DH32    011572            1050    1975#
DH33    011632            1056    1981#
DH34    011752            1063    1995#
DH35    012002            1069    1075    1999#
DH37    012042            1081    1147    1219    2005#
DH40    012112            1087    2012#
```

```
DH41    012162          1093    1099    1105    1111    1117    1123    2019#
DH47    012222          1130    2025#
DH5     010140           919    1833#
DH50    012465          1140    2055#
DH52    012576          1153    2068#
DH53    012636          1159    2074#
DH54    012676          1165    2080#
DH55    012736          1171    1177    1183    2086#
DH6     010224           926    1842#
DH60    012766          1189    1195    2090#
DH62    013016          1201    2094#
DH63    013056          1207    2100#
DH64    013116          1213    2106#
DH66    013156          1225    2112#
DH67    013216          1231    2118#
DH7     010330           933     939    1854#
DH70    013256          1237    2124#
DH71    013306          1243    2128#
DH72    013346          1249    2134#
DH73    013417          1255    2141#
DH74    013447          1261    2146#
DH75    013466          1267    1273    2149#
DISPLA  001142           708#   2626*   2634*   2712*   2896*   3038*   3795*   4121*   4995*   5364*   6468*   6497*
DISPRE  000174           631#   2634
DSWR  = 177570           445#    707    2625
DT1     013724           894    1280    2182#
DT11    014014           946    2193#
DT12    014026           952    2195#
DT13    014040           958    2197#
DT14    014054           964    2199#
DT15    014066           971    2201#
DT16    014106           977    2204#
DT17    014132           983    2208#
DT2     013732           900    2183#
DT20    014146           989    2210#
DT201   014616          1292    2270#
DT202   014626          1301    2272#
DT203   014640          1309    2274#
DT21    014156           995    1013    2212#
DT22    014170          1001    2214#
DT23    014204          1007    1019    1025    2216#
DT27    014220          1031    2218#
DT3     013742           907     914    2185#
DT30    014230          1038    2220#
DT31    014244          1045    2222#
DT32    014264          1051    2225#
DT33    014276          1058    2227#
DT34    014316          1064    2230#
DT35    014326          1070    1076    2232#
DT37    014340          1082    1088    1148    1220    2234#
DT41    014354          1094    1100    1106    1112    1118    1124    2236#
DT47    014366          1135    2238#
DT5     013756           921    2187#
DT50    014406          1142    2241#
DT52    014424          1154    2244#
DT53    014436          1160    2246#
```

```
DT54     014450            1166    2248#
DT55     014462            1172    1178    1184    1190    1196    2250#
DT6      013770             928    2189#
DT62     014472            1202    2252#
DT63     014504            1208    2254#
DT64     014516            1214    2256#
DT66     014530            1226    1244    2258#
DT67     014542            1232    2260#
DT7      014004             934     940    2191#
DT70     014554            1238    2262#
DT72     014564            1250    1256    2264#
DT74     014574            1262    2266#
DT75     014602            1268    1274    2267#
DUALAD   044406            3204    3265    3325    3386    6786#
EMTVEC=  000030             534#   2595*   2596*
EM1      002516             892     898    1314#
EM10     003257             938    1379#
EM11     003310             944    1384#
EM12     003352             950    1390#
EM13     003406             956    1395#
EM14     003454             962    1402#
EM15     003515             968    1408#
EM16     003557             975    1414#
EM17     003621             981    1420#
EM20     003665             987    1427#
EM201    007516            1288    1781#
EM202    007573            1296    1789#
EM203    007664            1305    1799#
EM21     003724             993    1433#
EM22     003771             999    1440#
EM23     004045            1005    1448#
EM24     004106            1011    1454#
EM25     004143            1017    1459#
EM26     004215            1023    1467#
EM27     004301            1029    1476#
EM3      002577             904    1323#
EM30     004361            1035    1485#
EM31     004430            1042    1492#
EM32     004507            1049    1500#
EM33     004570            1055    1509#
EM34     004641            1062    1516#
EM35     004710            1068    1523#
EM36     004763            1074    1531#
EM37     005040            1080    1539#
EM4      002715             911    1278    1337#
EM40     005131            1086    1549#
EM41     005216            1092    1558#
EM42     005267            1098    1565#
EM43     005337            1104    1572#
EM44     005406            1110    1579#
EM45     005453            1116    1586#
EM46     005522            1122    1593#
EM47     005573            1128    1600#
EM5      003040             918    1353#
EM50     005657            1139    1610#
EM51     005761            1146    1622#
```

```
EM52    006025          1152    1629*
EM53    006100          1158    1637*
EM54    006151          1164    1644*
EM55    006216          1170    1651*
EM56    006257          1176    1657*
EM57    006340          1182    1666*
EM6     003113           925    1361*
EM60    006407          1188    1673*
EM61    006443          1194    1678*
EM62    006502          1200    1684*
EM63    006535          1206    1689*
EM64    006565          1212    1694*
EM65    006633          1218    1701*
EM66    006714          1224    1710*
EM67    006762          1230    1717*
EM7     003203           932    1371*
EM70    007027          1236    1724*
EM71    007104          1242    1732*
EM72    007147          1248    1738*
EM73    007231          1254    1747*
EM74    007305          1260    1755*
EM75    007375          1266    1765*
EM76    007447          1272    1773*
ENTPT2  021522           868    2893*
ENTPT3  022104           869    3035*
ENTPT4  025100           870    3792*
ENTPT5  027216           871    4118*
ENTPT6  033706           872    4992*
ENTPT7  036012           873    5361*
EREXIT  043646          6532    6538*
ERRCNT  001430           836*   3049    3051    3081    3083    3112    3114    3144    3146    3213    3215    3274    3276
                        3334    3336    3395    3397    3448    3450    3493    3495    3535    3537    3578    3580    6421*
                        6488*
ERRVEC= 000004           527*   2623    2624*   2635*   2670*   2671*   2715*   2731*   3040*   3048*   3072*   3080*   3103*
                        3111*   3135*   3143*   4020*   4023*   4079*   4352*   4355*   4401*   4405*   4562*   4663*   4676*
                        4774*   4777*   6427    6428*   6430*   6433*
ERTYPE  043650          6507    6560*
ER200   002466          1285*   6584    6587
FORTY   001446           848*   2398    2431    2569*   2574*   2658    2722    4021    4341    4467    4511    4701    4716
                        4742    5033    6332
FSTTST  001360           813*   2540*   2542*   2544*   2546*   2548*   2550*   2552*   2678
GNS     = ******  U      630    2650    5892    5899    6295    6296    6297    6298    6299    6302    6303    6304    6305
HITMIS  001354           810*   2435
HOLFLG  001432           837*   4018*   4039*   4044    4048*
HT      = 000011         437*   6022    6063
IOTVEC= 000020           532*   2593*   2594*
KERSTK= 001100           598*   2567    2677    2857    2862    4752    5406    5687    5791    6761
KERVEC  015542          2514*   4844
KIPAR0= 172340           587*   3042    3178    3180    3193    3194    3207    3432    3606    3607*   3609    3614    3617
                        3798    3809*   4127*   4885*   5001*   5090*   5370*
KIPAR1= 172342           588*   3810*   4128*   4886*   5002*   5091*   5371*
KIPAR2= 172344           589*   3811*   4129*   4887*   5003*   5092*   5372*
KIPAR3= 172346           590*   3812*   4130*   4888*   5004*   5093*   5373*
KIPAR4= 172350           591*   3816*   3831*   3946*   3861*   3876*   3891*   3906*   3921*   3936*   3951*   3972*   3986*
                        4025*   4054    4058*   4073*   4134*   4190*   4247*   4300    4323*   4338    4896*   5009*   5094*
                        5394*   5518*   5673*
```

```
KIPAR5= 172352   592# 4026* 4042  4046  4055  4059* 4061  4248* 4263  4278  4291* 4322* 4897*
                5095*
KIPAR6= 172354   593# 4898* 5096* 5134* 5145*
KIPAR7= 172356   594# 3045  3196  3210  3441  3813* 4131* 4889* 5005* 5097* 5135* 5204* 5374*
KIPDR0= 172300   576# 3105  3299  3301  3314  3315  3328  3519  3674  3675* 3677  3682  3685
                3796  3806  4122* 4880* 4996* 5111  5118  5126* 5130* 5143* 5150  5158* 5162*
                5181* 5185* 5240  5248* 5272  5280* 5303* 5365* 5379
KIPDR1= 172302   577# 4123* 4881* 4997* 5127* 5159* 5182* 5249* 5281* 5304* 5366*
KIPDR2= 172304   578# 4124* 4882* 4998* 5128* 5160* 5183* 5250* 5282* 5305* 5367*
KIPDR3= 172306   579# 4125* 4883* 4999* 5368*
KIPDR4= 172310   580# 4133* 4135  4189* 4191  4244* 4327* 4337  4594* 4892* 5008* 5013  5019
                5024* 5025  5044* 5393* 5399* 5516* 5539* 5541* 5551* 5553* 5564* 5566* 5578*
                5580* 5592* 5594* 5607* 5609* 5623* 5625* 5672*
KIPDR5= 172312   581# 4245* 4262  4277  4282  4284* 4324* 4893*
KIPDR6= 172314   582# 4894* 5144*
KIPDR7= 172316   583# 3108  3317  3331  3528  4126* 4884* 5000* 5032  5046  5129* 5131* 5139
                5161* 5163* 5184* 5186* 5251* 5283* 5306* 5369*
LF    = 000012   438# 6057  6063
LOOP    020620  2656# 5934
MED   = 076600   608# 2570  2579  2582  4343  4357  4474  4485  4518  4719  4729  4735  5846
                5848  5850  5852  5854  5856  6335
MEMER   015250  2421# 2672
MEMERR  001356   812# 2433
MMEXP   001364   816# 2189  2486  2490  2669* 4148* 4151* 4204* 4207* 4254* 4258* 4269* 4273*
                4294* 4304* 4328* 4332* 4334* 4797*
MMFLAG  015432  2474# 2494* 2667* 6537*
MMR0  = 177572   599# 2484  2493* 2528  2662* 2897  2971  2974* 3821* 3836* 3851* 3866* 3881*
                3896* 3911* 3926* 3941* 3956* 3977* 3991* 4030* 4132* 4384* 4565* 4609  4618
                4629* 4714  4776* 4856* 4890* 4935  4951* 5006* 5054* 5205* 5327* 5375* 5491
                5493* 5637  5639* 5768  5770* 6533*
MMR1  = 177574   600# 2945
MMR2  = 177576   601# 2485  2529  2972  2981  4610  4619  4715  4934  5492  5638  5769
MMTRAP  015430  2473# 2674  4630  4837  4959  5051  5484  5631  5760
MMVEC = 000250   543# 2674* 2675* 4596* 4597* 4602* 4630* 4677* 4837* 4844* 4845* 4915* 4916*
                4959* 5010* 5051* 5398* 5484* 5520* 5631* 5680* 5760*
NXTTST  001444   847# 2451  2713* 2763* 2823* 2854* 2891* 2942* 2969* 3033* 3069* 3100* 3132*
                3174* 3235* 3295* 3356* 3426* 3471* 3513* 3556* 3602* 3637* 3670* 3705* 3744*
                3785* 4016* 4115* 4186* 4242* 4319* 4381* 4588* 4659* 4795* 4876* 4988* 5084*
                5229* 5357* 5514* 5662* 5786* 5823*
OLDPC   001434   839# 2395* 2397  2406  2429* 2436  2449* 2451* 2455  2482* 2496  2515* 2522*
                2531  5489* 5496  5635* 5642  5766* 5773  6759* 6773  6787* 6801  6817* 6835
OLDPS   001436   841# 2396* 2405  2430* 2454  2483* 2495  2516* 2523* 2530  5490* 5495  5636*
                5641  5767* 5772  6760* 6772
OLDPSW  001440   843# 6679* 6693  6694*
PADRSH  001372   820# 6635*
PADRSL  001370   818# 6636* 6637
PAFLAG  015252  2422# 2453* 2666* 6536*
PARCOU  044462  3439  3484  3526  3569  6816#
PARTAB  001450   859# 3750* 3756  3759
PATAND  001422   833# 2204  6739* 6824*
PATTOR  001420   832# 2204  6735* 6822*
PCONTR  001376   823# 2185  2434*
PCPUER  001406   827# 2183  2267  2402* 4035* 4037  4085* 4087* 4525* 4526
PHITMI  001400   824# 2185  2435*
PIRQ  = 177772   444#
PIRQVE= 000240   538#
```

```
PMMR0   001402   825*  2187  2189  2238  2241  2244  2248  2260  2484*  2490  2528*  4137*  4152
                4193*  4208  4609*  4623  4714*  4738  4838  4935*  4948  5491*  5637*  5768*
PMMR2   001404   826*  2187  2189  2238  2241  2244  2246  2260  2485*  2529*  4610*  4620  4715*
                4762  4934*  4936  5492*  5638*  5769*
PPARER  001374   822*  2185  2433*  2439
PR0    = 000000  461*
PR1    = 000040  462*
PR2    = 000100  463*
PR3    = 000140  464*
PR4    = 000200  465*
PR5    = 000240  466*
PR6    = 000300  467*
PR7    = 000340  468*
PS     = 177776  441*  442
PSW    = 177776  442*  2514  2524  2680*  2682*  2717  2718  2856*  2858*  2860*  4000*  4680*  4744*
                4746*  4770*  4771*  4773*  4815*  4820*  4857*  5030  5031*  5110*  5207*  5232*  5329*
                5403*  5417*  5426*  5435*  5443*  5454*  5465*  5475*  5523*  5531*  5548*  5560*  5574*
                5588*  5602*  5617*  5671*  5682*  5695*  5704*  5713*  5721*  5731*  5742*  5752*  5761*
                5788*  5825*
PWRMSG  042672  6348  6357#
PWRVEC= 000024   533*  2599*  2600*  6311*  6312*  6321*  6327*  6345*  6346*
RDMMR0  015610  2520  2528#
RESREG= 104407  6303*  6391
RESVEC= 000010   528*  2610*  2617*
RETRY   001442   845*  2446  2448*  6420*
RLFGIN= 000104   612*  4358  4362
RLJAM  = 000100   610*  2571  4344  4348  4471  4475  4515  4519
RLSERV= 000101   611*  4482  4486
RLWHAM= 000105   613*  4720  4724
RWHAM  = 000022   609*  4727  4730
SAVREG= 104406  6302*  6376
SR0    = 177572   547*  599
SR1    = 177574   548*  600
SR2    = 177576   549*  601
SR3    = 172516   550*
STACK  = 001100   432*  598  605  2591  4400  4448  4543  4548  4553  4564  4697  5826  5839
START   020066  2541  2543  2545  2547  2549  2551  2567*  6350
STKEXP  001366   817*  4399*  4410*  4421*  4449  4460
STKLMT= 177774   443*  2719  2720  4407*  4447*  4455*  4497*  4535*  4542*  4545*  4547*  4550*  4552*
                4555*  4566*
STRTAB  001460   867*  2683
STRT1   020000   634  2540#
STRT2   020010   636  2542#
STRT3   020020   638  2544#
STRT4   020030   640  2546#
STRT5   020040   642  2548#
STRT6   020050   644  2550#
STRT7   020060   646  2552#
SWR     001140   707*  2589  2625*  2627  2633*  2640*  5923  6319  6338*  6422  6436  6438  6446
                6453  6498  6505  6517  6520  6531  6576
SWREG   000176   632*  2633
SW0    = 000001  496*
SW00   = 000001  486*  496
SW01   = 000002  485*  495
SW02   = 000004  484*  494
SW03   = 000010  483*  493
```

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SW04   = 000020            482#    492
SW05   = 000040            481#    491
SW06   = 000100            480#    490
SW07   = 000200            479#    489
SW08   = 000400            478#    488
SW09   = 001000            477#    487
SW1    = 000002            495#
SW10   = 002000            476#
SW11   = 004000            475#
SW12   = 010000            474#
SW13   = 020000            473#
SW14   = 040000            472#
SW15   = 100000            471#
SW2    = 000004            494#
SW3    = 000010            493#
SW4    = 000020            492#
SW5    = 000040            491#
SW6    = 000100            490#
SW7    = 000200            489#   6576
SW8    = 000400            488#
SW9    = 001000            487#   6531
TBIT   = 000020           4661#   4696   6675#   6677   6680   6694
TBITO  = 104410           2765    4383   4662    5107   6304#
TBITOF   044172           6304    6676#
TBITR  = 104411           2825    4590   4990    5359   6305#
TBITRE   044220           6305    6692#
TBITVE= 000014             529#   2607*  2608*
TESTNO   001412            829#   2182   2183    2185   2187   2189   2191   2193   2195   2197   2199   2201   2204
                          2208    2210   2212    2214   2216   2218   2220   2222   2225   2227   2230   2232   2234
                          2236    2238   2241    2244   2246   2248   2250   2252   2254   2256   2258   2260   2262
                          2264    2266   2267    2270   2272   2274   6487*
TIMEOU   044312           3040    3072   3103    3135   6750#
TKVEC  = 000060            536#
TOFLAG   044314           6752#   6771*
TPVEC  = 000064            537#
TRAPVE= 000034             535#   2597*  2598*
TRTVEC= 000014             530#
TST1     021010            867    2679   2709#
TST10    022074           2969    2998   3031#
TST11    022220           3033    3050   3067#
TST12    022322           3069    3082   3098#
TST13    022424           3100    3113   3130#
TST14    022526           3132    3145   3172#
TST15    022732           3174    3214   3233#
TST16    023136           3235    3275   3293#
TST17    023342           3295    3335   3354#
TST2     021142           2713    2732   2761#
TST20    023546           3356    3396   3424#
TST21    023700           3426    3449   3469#
TST22    024032           3471    3494   3511#
TST23    024164           3513    3536   3554#
TST24    024316           3556    3579   3600#
TST25    024430           3602    3635#
TST26    024542           3637    3668#
TST27    024654           3670    3703#
TST3     021352           2763    2821#
```

```
TST30   024766            3705    3742*
TST31   025070            3744    3783*
TST32   026632            3785    4014*
TST33   027200            4016    4081    4113*
TST34   027524            4115    4184*
TST35   027724            4186    4240*
TST36   030222            4242    4317*
TST37   030466            4319    4379*
TST4    021442            2823    2852*
TST40   031574            4381    4586*
TST41   032014            4588    4657*
TST42   032652            4659    4793*
TST43   033170            4795    4843    4874*
TST44   033674            4876    4986*
TST45   034354            4988    5052    5082*
TST46   035252            5084    5227*
TST47   036000            5229    5355*
TST5    021512            2854    2863    2889*
TST50   036742            5357    5486    5512*
TST51   037630            5514    5632    5660*
TST52   040376            5662    5763    5784*
TST53   040510            5786    5822*
TST6    021700            2891    2940*
TST7    021730            2942    2967*
TYPDS = 104405            5896    5903    6299*   6622
TYPE  = 104401            2648    5890    5897    5904    6027    6180    6255    6295*   6347    6500    6508    6567    6594
                          6596    6601    6603    6641    6647
TYPOC = 104402            6296*   6565    6616
TYPON = 104404            6298*
TYPOS = 104403            6297*
UIPAR0= 177640             565*   3074    3239    3241    3254    3255    3268    3477    3641    3642*   3644    3649    3652
                          3802    4665*   4805*   4903*   5098*   5386*
UIPAR1= 177642             566*   4666*   4806*   4904*   5099*   5387*
UIPAR2= 177644             567*   4667*   4807*   4905*   5100*   5388*
UIPAR3= 177646             568*   4668*   4808*   4906*   5101*   5389*
UIPAR4= 177650             569*   4678*   4907*   5102*   5395*   5519*   5674*
UIPAR5= 177652             570*   4811*   4908*   5103*
UIPAR6= 177654             571*   4909*   5104*   5256*   5267*
UIPAR7= 177656             572*   3077    3257    3271    3486    4669*   4809*   5105*   5257*   5326*   5390*
UIPDR0= 177600             554*   3137    3360    3362    3375    3376    3389    3562    3709    3710*   3712    3717    3720
                          3800    4670*   4800*   5122    5173    5233    5244    5252*   5265*   5284*   5295    5307*   5383
                          5667
UIPDR1= 177602             555*   4671*   4801*
UIPDR2= 177604             556*   4672*   4802*
UIPDR3= 177606             557*   4673*   4803*   4899*
UIPDR4= 177610             558*   4679*   4691*   4900*   5517*   5681*
UIPDR5= 177612             559*   4810*   4901*
UIPDR6= 177614             560*   4902*   5266*
UIPDR7= 177616             561*   3140    3378    3392    3571    4674*   4804*   5253*   5261    5285*   5308*
USESTK= 000700             605*   2681    2859    5409    5532    5684    5794    5808
USEVEC  015572            2522*   4812
WBIT  = 000100            5007*   5014    5020    5035    5040    5047
WCNSSW= 000226             615*   5855    6336
WLFGIN= 000304             619*   5851
WLJAM = 000300             617*   5847
WLSERV= 000301             618*   5849
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WLWHAM= 000305            616#   2580   5857
WWHAM = 000222            614#   2583   4736   5853
$APTHD  000234            657     663#
$ASTAT= ****** U         6097   6112
$ATYC   041516           6088   6070#
$ATY1   041472           6066#
$ATY3   041500           6012   6067#
$ATY4   041510           6069#  6513
$AUTOB  001134            704#
$BASE   001302            782#
$BDADR  001122            699#
$BDDAT  001126            701#
$BELL   001216            733#  6500   6539
$CDW1   001306            784#
$CDW2   001310            785#
$CHARC  041466           6029#  6039#  6046   6055#  6060#
$CKSWR= ****** U         6302
$CLR.T  041024           5909   5912#
$CMTAG  001100            687#  2586   2587   2595   2601   2602   2603
$CM1  = 000006            719#   720#   721#   722#   723#   724#   725#
$CM2  = 000014            719#   720#   721#   722#   723#   724#   725#
$CM3  = 000006            717#   719
$CM4  = 000006            725#   726#   727#   728#   729#   730#   731#
$CPUOP  001254            756#
$CRLF   001223            735#  5904   6028   6063   6508   6539   6567   6596   6603
$DBLK   042402           6221   6255   6263#
$DB20   042736           6376#  6638
$DDW0   001312            786#
$DDW1   001314            787#
$DDW10  001336            796#
$DDW11  001340            797#
$DDW12  001342            798#
$DDW13  001344            799#
$DDW14  001346            800#
$DDW15  001350            801#
$DDW2   001316            788#
$DDW3   001320            789#
$DDW4   001322            790#
$DDW5   001324            791#
$DDW6   001326            792#
$DDW7   001330            793#
$DDW8   001332            794#
$DDW9   001334            795#
$DEVCT  001236            747#
$DEVM   001304            783#
$DOAGN  041044           5886   5907   5914   5920#
$DTBL   042372           6224   6259#
$ENDAD  041034            676   2646   5916#  6527
$ENDCT  040662           2601   5888#
$ENULL  041110           5936#
$ENV    001246            752#  6007   6075   6099   6510
$ENVM   001247            753#  2638   6009   6014   6077
$EOP    040626           5823   5840   5878#
$EOPCT  040654           2601*  5885#  5889
$ERFLG  001103            690#  6410   6442   6444   6450*  6472   6495*  6539   6766   6796   6830
$ERMAX  001115            696#  2604*  6444   6467*  6472
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$ERROR  043352          2256    2595    6486#
$ERRPC  001116           697#   2191    2193    2195    2197    2199    2201    2204    2208    2210    2212    2214    2216
                        2218    2220    2222    2225    2227    2230    2232    2234    2236    2238    2241    2244    2246
                        2248    2250    2252    2254    2258    2260    2262    2264    2266    2267    2270    2272    2274
                        6502*   6503*   6504    6539    6564
$ERRTB  001476           888#   6587    6591
$ERTTL  001112           694#   5901    5905*   6501*   6539
$ESCAP  001214           732#   2603*   6466*   6523    6525    6539
$ETABL  001246           751#
$ETEND  001352           669     804#
$FATAL  001230           744#   6103*
$FFLG   041736          6066*   6069*   6097    6106*   6114#
$FILLC  001156           715#   6032    6063
$FILLS  001155           714#   6063
$GDADR  001120           698#
$GDDAT  001124           700#
$GET42  041006          5906#
$GTSWR= ****** U        6301
$HD   = 000000           397
$HIBTS  000234           664#
$ICNT   001104           691#   6457*   6458    6460*   6471
$ILLUP  042664          6311    6327    6354#
$INTAG  001135           705#
$ITEMB  001114           695#   6504*   6512    6539    6562
$LF     001224           736#   6063    6539
$LFLG   041735          6107*   6113#
$LOOP   041102          5928    5932#
$LPADR  001106           692#   2449    2619*   2653*   2827*   4592*   4992*   5361*   6448*   6464*   6469    6471
$LPERR  001110           693#   2620*   2652*   2710*   2730*   2766*   2776*   2787*   2795*   2801*   2809*   2829*   2840*
                        2894*   2903*   2909*   2914*   2927*   2973*   2980*   2986*   2993*   3036*   3041*   3047*   3073*
                        3079*   3104*   3110*   3136*   3142*   3177*   3192*   3212*   3238*   3253*   3273*   3298*   3313*
                        3333*   3359*   3374*   3394*   3430*   3447*   3475*   3492*   3517*   3534*   3560*   3577*   3604*
                        3613*   3622*   3639*   3648*   3657*   3672*   3681*   3690*   3707*   3716*   3725*   3746*   3754*
                        3762*   3793*   3814*   3829*   3844*   3859*   3874*   3889*   3904*   3919*   3934*   3949*   3971*
                        3985*   4001*   4034*   4072*   4080*   4119*   4136*   4171*   4192*   4227*   4252*   4266*   4290*
                        4303*   4404*   4411*   4415*   4420*   4567*   4598*   4631*   4675*   4775*   4814*   4842*   4910*
                        4960*   4993*   5011*   5017*   5023*   5029*   5043*   5050*   5106*   5109*   5208*   5231*   5330*
                        5362*   5391*   5402*   5416*   5425*   5434*   5442*   5453*   5464*   5474*   5485*   5535*   5547*
                        5559*   5573*   5587*   5601*   5616*   5630*   5670*   5694*   5703*   5712*   5720*   5730*   5741*
                        5751*   5762*   5800*   5810*   5824*   6448    6465*   6471    6522
$MADR1  001260           769#
$MADR2  001264           773#
$MADR3  001270           776#
$MADR4  001274           779#
$MAIL   001226           665     669     742#    2637    6007    6463    6510
$MAMS1  001256           763#
$MAMS2  001262           771#
$MAMS3  001266           774#
$MAMS4  001272           777#
$MBADR  000236           665#
$MFLG   041734          6067*   6073    6108*   6112#
$MSGAD  001242           749#   6083*   6086
$MSGLG  001244           750#   6088*
$MSGTY  001226           743#   6081    6089*   6101    6105*
$MTYP1  001257           764#
$MTYP2  001263           772#
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$MTYP3  001267            775#
$MTYP4  001273            778#
$MXCNT  043350           6461    6471#
$NULL   001154            713#    6034    6063
$NWTST= 000001           2695#   2697    2743#   2745    2813#   2815    2843#   2845    2877#   2879    2931#   2933    2955#
                         2957    3019#   3021    3055#   3057    3086#   3088    3118#   3120    3158#   3160    3219#   3221
                         3279#   3281    3340#   3342    3409#   3411    3454#   3456    3498#   3500    3541#   3543    3592#
                         3594    3627#   3629    3660#   3662    3695#   3697    3729#   3731    3774#   3776    4003#   4005
                         4102#   4104    4173#   4175    4230#   4232    4307#   4309    4367#   4369    4574#   4576    4632#
                         4634    4780#   4782    4862#   4864    4976#   4978    5068#   5070    5213#   5215    5343#   5345
                         5500#   5502    5647#   5649    5776#   5778    5812#   5814
$OCNT   042162           6152*   6181*   6194#
$OCTVL  043040           6378    6403#
$OMODE  042164           6147*   6151*   6156    6159*   6170*   6196#
$OVER   043334           6423    6441    6449    6459    6468#
$PASS   001234            746#   2637*   2656    5882*   5883*   5894    5935    6455    6472
$PASTM  000242            667#
$PWRAD  042646           6350#
$PWRDN  042472           2599    6311#   6345
$PWRMG  042642           6348#
$PWRUP  042544           6321    6327#
$QUES   001222            734#   6063    6539
$RDCHR= ****** U         6302
$RDDEC= ****** U         6302
$RDLIN= ****** U         6302
$RDOCT= ****** U         6302
$REGAD  001160            717#
$REG0   001162            719#   2199    2208    2210    2212    2214    2216    2218    2220    2222    2227    2254    2258
                         2264    2270    2272    2274    6489*
$REG1   001164            720#   2191    2193    2208    2212    2216    2220    2222    2230    2232    2238    2246    2252
                         2256    2258    2262    2272    2274    6490*
$REG2   001166            721#   2193    2195    2199    2208    2216    2220    2222    2227    2236    2238    2248    2256
                         2267    2274    6491*
$REG3   001170            722#   2195    2227    2232    2236    2238    2252    2254    2267    6492*
$REG4   001172            723#   2274    6493*
$REG5   001174            724#   6494*
$RESRE  041152           5972#   6303
$RTNAD  041104           5934#
$RTRN   041100           2607    2609*   2614*   5910    5929#
$R2A  = ****** U         6304
$SAVRE  041114           5956#   6302
$SAVR6  042670           6320*   6328    6329*   6330*   6356#
$SCOPE  043056           2593    6419#
$SETUP= 000037            624#   2592    2593    2595    2597    2599    2601    2602    2603    2605    2619    2646    2649
                         5880    6352    6420    6487    6520    6527
$STUP = 177777            624#
$SVLAD  043300           6431    6462#
$SVPC = 000250            674#    679
$SWR  = 177400            388#    397     401     402     403     404     405     406     407     408     731     732     733
                         2602    2603    2605    2619    2620    2713    2765    2825    2856    2893    2944    2971    3035
                         3071    3102    3134    3176    3237    3297    3358    3428    3473    3515    3558    3604    3639
                         3672    3707    3746    3787    4018    4117    4188    4244    4321    4383    4590    4661    4797
                         4878    4990    5086    5231    5359    5516    5664    5788    5823    5874    5881    5908    5921
                         5935    6351    6411    6412    6413    6414    6415    6422    6434    6436    6437    6442    6443
                         6444    6451    6452    6453    6465    6468    6471    6478    6479    6480    6481    6482    6498
                         6505    6517    6520    6539
```

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$SWREG  001250            754*  2640
$SWRMK= 000200            388*   408   409  6415  6416  6438  6439
$TBIT   041106           2618*  5925* 5935* 6352*
$IESIN  001232            745*  6463*
$TIMES  001212            731*  2602* 3428* 3473* 3515* 3558* 4117* 4188* 4878* 5881* 6451* 6458  6461*
                         6471
$TKB    001146            710*
$TKS    001144            709*
$TMP0   001176            725*  2234  2241  2250  3198* 3205* 3259* 3266* 3319* 3326* 3380* 3387* 3815*
                         3828  3830* 3843  3845* 3858  3860* 3873  3875* 3888  3890* 3903  3905* 3918
                         3920* 3933  3935* 3948  3950* 3963  4036* 4057  4262* 4277* 4337* 4442* 4452
                         4494  4506  4532  4618* 4623  4921* 4933  5013* 5014  5019* 5020  5025* 5026
                         5030* 5031  5032* 5035  5040  5046* 5047  5116* 5142* 5169* 5192* 5195  5238*
                         5264* 5291* 5314* 5317
$TMP1   001200            726*  2222  2225  2234  3817* 3832* 3847* 3862* 3877* 3892* 3907* 3922* 3937*
                         3952* 3973* 3987* 4019* 4040  4042* 4049* 4263* 4278* 4338* 4424* 4427  4503
                         4698* 4707* 4713* 4741* 4749* 4754* 4761* 4764* 4765
$TMP2   001202            727*  2222  2225  2234  2241  3818* 3833* 3848* 3863* 3878* 3893* 3908* 3923*
                         3938* 3953* 3974* 3988* 4046* 4264* 4279* 4339* 4385* 4465  4478* 4489* 4509
                         4522* 4528* 4619* 4620  4699* 4703* 4705  5455* 5456  5476* 5477  5604  5605*
                         5619* 5621  5732* 5733  5753* 5754
$TMP3   001204            728*  2227  4054* 4470* 4480  4481* 4491  4514* 4524  4617* 4622* 4625* 4626
                         4718* 4737
$TMP4   001206            729*  2214  2227  4055* 4348* 4362* 4471* 4482* 4515* 4724* 4727*
$TMP5   001210            730*  2197  2201  2204  2214  3051* 3083* 3114* 3146* 3215* 3276* 3336* 3397*
                         3450* 3495* 3537* 3580* 4347* 4361* 4473* 4484* 4517* 4723* 4728*
$TN   = 000054            388*   397  2679  2695  2713* 2732  2743  2762  2765* 2813  2822  2825* 2843
                         2853  2856* 2863  2877  2890  2893* 2931  2941  2944* 2955  2968  2971* 2998
                         3019  3032  3035* 3050  3055  3068  3071* 3082  3086  3099  3102* 3113  3118
                         3131  3134* 3145  3158  3173  3176* 3214  3219  3234  3237* 3275  3279  3294
                         3297* 3335  3340  3355  3358* 3396  3409  3425  3428* 3449  3454  3470  3473*
                         3494  3498  3512  3515* 3536  3541  3555  3558* 3579  3592  3601  3604* 3627
                         3636  3639* 3660  3662  3672* 3695  3704  3707* 3729  3743  3746* 3774  3784
                         3787* 3792  4003  4015  4018* 4081  4102  4114  4117* 4118  4173  4185  4188*
                         4230  4241  4244* 4307  4318  4321* 4367  4380  4383* 4574  4587  4590* 4632
                         4658  4661* 4780  4794  4797* 4843  4862  4875  4878* 4976  4987  4990* 4993
                         5052  5068  5083  5086* 5213  5228  5231* 5343  5356  5359* 5362  5486  5500
                         5513  5516* 5632  5647  5661  5664* 5763  5776  5785  5788* 5812  5823*
$TPB    001152            712*  6052* 6063
$TPFLG  001157            716*  6001  6063
$TPS    001150            711*  6050  6063
$TRAP   042412           2597   6272*
$TRAP2  042434           6283*  6294
$TRP  = 000012           6287*  6296* 6297* 6298* 6299* 6300* 6302  6303* 6304* 6305* 6306*
$TRPAD  042446           6277   6294*
$TSTM   000240            666*
$TSTNM  001102            689*  2711* 2712  2895* 2896  3037* 3038  3794* 3795  4120* 4121  4994* 4995
                         5363* 5364  5880* 6410  6440  6462* 6463  6468  6472  6487  6497  6539
$TYPBN= ****** U          6300
$TYPDS  042166           6209*  6299
$TYPE   041210           6001*  6094  6287  6295
$TYPEC  041422           6031   6038  6045  6050* 6051
$TYPEX  041470           6056   6058  6061*
$TYPOC  041764           6150*  6296
$TYPON  042000           6149   6152* 6298
$TYPOS  041740           6145*  6297
```

```
$UNIT   001240            748#
$UNITM  000244            668#
$USWR   001252            755#
$VECT1  001276            780#
$VECT2  001300            781#
$XTSTR  043076           6425#
$$GET4= 000001           5908#   5913
$OFILL  042163           6146#   6150#   6160    6195#
$40CAT= ****** U         6422    6507
.       = 044552          626#    630#    653     654#    656#    658#    674     675#    677#    679#    686#    737     851#
                         2364#   2538#   2590    2619    2620    2652    2653    4477    4488    4521    4732    5893#   5935
                         5937#   6063    6115#   6263#   6323    6355    6403#   6471    6472    6539    6655#
.$ASTA= ****** U         6067    6070
.$X     = 000234          653#    658
```

```
ADD18    2366#  3814   3829   3844   3859   3874   3889   3904   3919   3934   3949
AND      2366#  6763   6789   6793   6819   6823   6827
BYTADR   2366#  3604   3639   3672   3707
BYTEMG   3625#  3629   3662   3697
CMPPDR   2366#  5148   5172   5270   5294
COMMEN    539#
COUNTI   2366#  3429   3474   3516   3559
DUAL     2366#  3176   3237   3297   3358
DUALMA   2366#  5109   5231
DUALMG   3218#  3221   3281   3342
ENDCOM    539#
ENTRY    2366#  2709   2893   3035   3792   4118   4993   5362
ERROR     433#  2400   2403   2441   2443   2445   2488   2492   2519   2525   2734   2774   2785   2794   2799
          2808   2839   2864   2902   2908   2913   2924   2950   2979   2985   2992   2999   3052   3084   3115
          3147   3184   3216   3245   3277   3305   3337   3366   3398   3451   3496   3538   3581   3612   3620
          3647   3655   3680   3688   3715   3723   3760   3827   3842   3857   3872   3887   3902   3917   3932
          3947   3962   3984   3998   4047   4056   4078   4157   4161   4213   4217   4265   4280   4302   4340
          4349   4363   4451   4464   4479   4490   4505   4508   4523   4529   4544   4549   4554   4628   4725
          4733   4767   4819   4841   4938   4950   5016   5022   5028   5037   5042   5049   5156   5179   5198
          5278   5301   5320   5412   5414   5423   5432   5440   5449   5461   5471   5483   5494   5530   5545
          5557   5570   5584   5598   5613   5629   5640   5690   5692   5701   5710   5718   5727   5738   5748
          5759   5771   5797   579    5807   5834   5838   6768   6770   6798   6800   6832   6834
ESCAPE    539#
GETPRI    539#  5921
GETSWR    539#  2649#
LOADPD   2366#  3805   5117   5121   5239   5243   5378   5382   5666
MGDUAL   5068#  5070   5215
MMLOAD   2366#  4122   4880   4996   5365
MSG1     2695#  2697
MSG10    2955#  2957
MSG11    3019#  3021
MSG12    3055#  3057
MSG13    3086#  3088
MSG14    3118#  3120
MSG15    3158#  3160
MSG16    3219#  3221
MSG17    3279#  3281
MSG20    3340#  3342
MSG21    3409#  3411
MSG22    3454#  3456
MSG23    3498#  3500
MSG24    3541#  3543
MSG25    3592#  3594
MSG26    362^#  3629
MSG27    3660#  3662
MSG30    3695#  3697
MSG31    3729#  3731
MSG32    3774#  3776
MSG33    4003#  4005
MSG345   4102#  4104   4175
MSG36    4230#  4232
MSG37    4307#  4309
MSG4     2743#  2745
MSG40    4367#  4369
MSG41    4574#  4576
MSG42    4632#  4634
```

```
MSG43    4780#  4782
MSG44    4862#  4864
MSG45    4976#  4978
MSG46    5068#  5070
MSG47    5213#  5215
MSG5     2813#  2815
MSG50    5343#  5345
MSG51    5500#  5502
MSG52    5647#  5649
MSG53    5776#  5778
MSG54    5812#  5814
MSG6     2843#  2845
MSG7     2877#  2879
MSG7A    2931#  2933
MULT      539#
NEWTST    539#  2695  2743  2813  2843  2877  2931  2955  3019  3055  3086  3118  3158  3219  3279
          3340  3409  3454  3498  3541  3592  3627  3660  3695  3729  3774  4003  4102  4173  4230
          4307  4367  4574  4632  4780  4862  4976  5068  5213  5343  5500  5647  5776  5812
PAGEF    2366#  4133  4189
PARMSG   3453#  3456
PDRMSG   3540#  3543
POP       539#  5977  6109  6110  6250  6338  6339
PUSH      539#  5957  6070  6072  6093  6209  6313  6319
READLG   2366#  4470  4481  4514
REPORT    539#
RESPMG   3054#  3057  3088  3120
RESPON   2366#  3039  3071  3102  3134
SAVTST   2366#  6487
SCOPE     434#  2762  2822  2853  2890  2941  2968  3032  3068  3099  3131  3173  3234  3294  3355
          3425  3470  3512  3555  3601  3636  3669  3704  3743  3784  4015  4114  4185  4241  4318
          4380  4587  4658  4794  4875  4987  5083  5228  5356  5513  5661  5785  5822  5879
SETACF   2366#  4321
SETPRI    539#
SETTRA   6287#  6296  6297  6298  6299  6302  6303  6304  6305
SETUP     539#  2585
SKIP      539#  2679  2732  2863  2998  3050  3082  3113  3145  3214  3275  3335  3396  3449  3494
          3536  3579  4081  4843  5052  5486  5632  5763
SLASH     539#
SPACE     539#
SSCOPE   2366#  6420
STARS     539#   650   652   659   672   682   737   740  2695  2708  2743  2760  2813  2820  2843
          2851  2877  2888  2931  2939  2955  2966  3019  3030  3055  3066  3086  3097  3118  3129
          3158  3171  3219  3232  3279  3292  3340  3353  3409  3423  3454  3468  3498  3510  3541
          3553  3592  3599  3627  3634  3660  3667  3695  3702  3729  3741  3774  3782  4003  4013
          4102  4112  4173  4183  4230  4239  4307  4316  4367  4378  4574  4585  4632  4656  4780
          4792  4862  4873  4976  4985  5068  5081  5213  5226  5343  5354  5500  5511  5647  5659
          5776  5783  5812  5821  5870  5941  5986  6065  6122  6199  6266  6309  6325  6367  6407
          6474
SWRSU     539#  2621#
TRACK    2366#  2761  2821  2852  2889  2940  2967  3031  3067  3098  3130  3172  3233  3293  3354
          3424  3469  3511  3554  3600  3635  3668  3703  3742  3783  4014  4113  4184  4240  4317
          4379  4586  4657  4793  4874  4986  5082  5227  5355  5512  5660  5784
TRACK1   2366#  2762  2822  2853  2890  2941  2968  3032  3068  3099  3131  3173  3234  3294  3355
          3425  3470  3512  3555  3601  3636  3669  3704  3743  3784  4015  4114  4185  4241  4318
          4380  4587  4658  4794  4875  4987  5083  5228  5356  5513  5661  5785
TRMTRP   6287#
```

```
TYPBIN    539#
TYPDEC    539#   5894    5901
TYPNAM    539#   2642
TYPNUM    539#
TYPOCS    539#
TYPOCT    539#
TYPTXT    539#   5890    5897
UPCODE   2366#   6332
USER      623#    806
ZEROER   2366#   6531
$$CMRE    680#    719     720     721     722     723     724
$$CMTM    680#    725     726     727     728     729     730
$$ESCA    539#
$$NEWT    539#   2695    2743    2813    2843    2877    2931    2955    3019    3055    3086    3118    3158    3219    3279
         3340    3409    3454    3498    3541    3592    3627    3660    3695    3729    3774    4003    4102    4173    4230
         4307    4367    4574    4632    4780    4862    4976    5068    5213    5343    5500    5647    5776    5812
$$SET    6287#   6296    6297    6298    6299    6302    6303    6304    6305
$$SETM   2637#
$$SETU   2605#
$$SKIP    539#   2679    2732    2863    2998    3050    3082    3113    3145    3214    3275    3335    3396    3449    3494
         3536    3579    4081    4843    5052    5486    5632    5763
.EQUAT    388#    429
.HEADE    388#
.KT11     388#    539
.SETUP    388#    624
.SWRHI    388#    397
.SWRLO    409#
.$ACTI    388#    670
.$APTB    388#    738#
.$APTH    388#    648
.$APTY    388#   6063
.$CATC    388#    624
.$CMTA    388#    680
.$DB20    388#   6365
.$EOP     388#   5868
.$ERRO    388#   6472
.$POWE    388#   6307
.$SAVE    388#   5939
.$SCOP    388#   6405
.$TRAP    388#   6264
.$TYPD    388#   6197
.$TYPE    388#   5984
.$TYPO    388#   6120

. ABS.   044552      000

 ERRORS DETECTED:  0

 CQKTAB.BIN,CQKTAB.LST/CRF/SOL=CQKTAB.P11
 RUN-TIME: 31 23 2 SECONDS
 RUN-TIME RATIO: 151/57=2.6
 CORE USED:  31K  (61 PAGES)
```