KTF11-AA

KTF11-AA DIAG
CJKDACO

AH-F137C-MC
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IDENTIFICATION

PRODUCT CODE: AC-F138C-MC

PRODUCT NAME: CJKDAC0 KTF11-AA MEMORY MANAGEMENT DIAGNOSTIC

DATE: NOV-1979

MAINTAINER: DIAGNOSTIC PROGRAMMIMG

PROGRAM HISTORY

DATE	REVISION	REASON FOR REVISION
12-JAN-79	A	FIRST RELEASE
JUNE-79	B	SUBROUTINE FORMPA MODIFIED ERROR INFORMATION STORED IN R0,R2. THIS REVISION SAVES THE REGISTERS ON ENTRY TO THE ROUTINE AND RESTORES THEM ON EXIT.
NOVEMBER-79	C	CORRECTIONS WERE MADE TO THE MULTI-TESTER SUPPORT CODE. ALSO CODE WAS ADDED TO ALLOW PROGRAM OPERATION WHILE LINE CLOCK IS INTERRUPTING.

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1.0 PROGRAM INFORMATION

1.1 ABSTRACT

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

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

1.2 REQUIREMENTS

A KDF11 PROCESSOR WITH A MINIMUM OF 16K OF MEMORY AND A CONSOLE TERMINAL ARE REQUIRED TO RUN THE PROGRAM UNLESS THE PROGRAM IS RUNNING UNDER APT OR ACT IN WHICH CASE THE CONSOLE TERMINAL IS NOT NECESSARY.

1.3 RELATED DOCUMENTS AND STANDARDS

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

1.4 PRELIMINARY PROGRAMS

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

CJKDB DCF11-AA CPU TESTS

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

2.0 OPERATING INSTRUCTIONS

2.1 LOADING PROCEDURES

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

2.2 STARTING PROCEDURES

THE PROGRAM IS STARTED BY LOADING ADDRESS 200. SINCE THERE
IS NO HARDWARE SWITCH REGISTER, THE PROGRAM WILL USE THE
SOFTWARE SWITCH REGISTER AT LOCATION 176 (LOCATION 174
WILL BE USED AS THE SOFTWARE DISPLAY REGISTER). IN THAT CASE
THE PROGRAM WILL ASK FOR THE INITIAL SWITCH REGISTER
VALUE BY TYPING 'SWR= XXXXXX NEW= '' AFTER TYPING
THE NAME OF THE PROGRAM (XXXXXX = THE OCTAL CONTENTS OF
LOCATION 176). (SEE SECTION 2.4)

2.3 CONTROL SWITCH SETTINGS

SWITCH	OCTAL VALUE	USE
SW15	100000	HALT ON ERROR THIS SWITCH WHEN SET WILL HALT THE PROCESSOR WHEN AN ERROR IS DETECTED AFTER THE ERROR MESSAGE HAS BEEN TYPED. PRESSING CONTINUE WILL RESUME TESTING (SEE SECTION 3.1 ABOUT LOADING THE SWITCH REG BEFORE CONTINUING).
SW14	040000	LOOP ON TEST THIS SWITCH WHEN SET WILL CAUSE THE PROGRAM TO LOOP ON THE CURRENT SUBTEST.
SW13	020000	INHIBIT ERROR TYPEOUTS THIS SWITCH WHEN SET WILL INHIBIT THE TYPING OF ERROR MESSAGES.
[illegible]	010000	INHIBIT TRACE TRAP THIS SWITCH WHEN SET WILL INHIBIT T-BIT TRAPPING WHICH NORMALLY TAKES PLACE DURING EVERY OTHER PASS STARTING WITH THE THIRD PASS.
SW11	004000	INHIBIT SUBTEST ITERATIONS THIS SWITCH WHEN SET INHIBITS ITERATIONS OF EACH SUBTEST AFTER THE FIRST PASS. IF THIS SWITCH IS NOT SET, EACH SUBTEST IS RUN 200. TIMES.

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

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

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

2.4 LOADING THE SWITCH REGISTER

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

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

SWR = XXXXXX NEW =

WHERE "XXXXXX" IS THE CURRENT OCTAL CONTENTS OF LOC. 176.
THE OPERATOR MAY THEN TYPE ANY ONE OF THE FOLLOWING:

XXXXXX<CR>	ONE TO SIX OCTAL DIGITS FOLLOWED BY A CARRIAGE RETURN WHICH WILL BE LOADED AS THE NEW VALUE FOR THE SWITCH REG.
<CR>	JUST A <CR>, LEAVES THE SWITCH REG. AS IT IS.
XXX^U	A CONTROL-U (^U) WILL CAUSE ALL OF THE DIGITS TYPED SO FAR TO BE IGNORED.
^C	WILL CAUSE THE PROGRAM TO TYPE THE PRESENT TEST AND PASS NUMBERS, REQUEST A NEW VALUE FOR THE SWITCH REG., AND JUMP TO THE END-OF-PASS ROUTINE SO THE PROGRAM WILL GO DIRECTLY TO THE NEXT PASS WITH A NEW SW. REG. VALUE
<ILL.CHAR>	ANY CHARACTER TYPED WHICH IS NOT ANY OF THE ABOVE OR AN OCTAL DIGIT WILL CAUSE THE PROGRAM TO TYPE A "?<CRLF>" AND REACT AS THOUGH A ^U HAD BEEN TYPED.

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

2.5 EXECUTION TIMES

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

THE RUN TIME FOR A SINGLE PASS WITH ITERATIONS
AND TRACE TRAPPING ENABLED IS APPROXIMATELY 30 SECONDS.

3.0 ERROR INFORMATION

3.1 ERROR REPORTING PROCEDURES

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

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

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

3.2 INTERPRETING ERROR REPORTS

EVERY ERROR REPORT TYPES THE NUMBER OF THE TEST IN WHICH
THE ERROR TOOK PLACE (TESTNO) AND THE LOCATION OF THE
ERROR CALL (ERRORPC). THESE TWO VALUES PINPOINT THE
PLACE IN THE CODE THAT THE ERROR OCCURRED. BY REFERRING
TO THE PROGRAM LISTING, THE OPERATOR CAN THEN READ THE
COMMENTS ASSOCIATED WITH THAT PARTICULAR ERROR AND SUBTEST.
A DESCRIPTION OF THE TEST FOUND IN THE PROGRAM LISTING
WILL ALSO PROVIDE THE OPERATOR WITH INFORMATION ON THE LOGIC
AND FUNCTIONS BEING TESTED.

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

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

3.3 SAMPLE ERROR REPORT

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

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

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

4.0 MISCELLANEOUS INFORMATION

4.1 ACT/APT/XXDP COMPATABILITY

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

4.2 END-OF-PASS MESSAGE

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

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

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

4.3 T-BIT TRAPPING

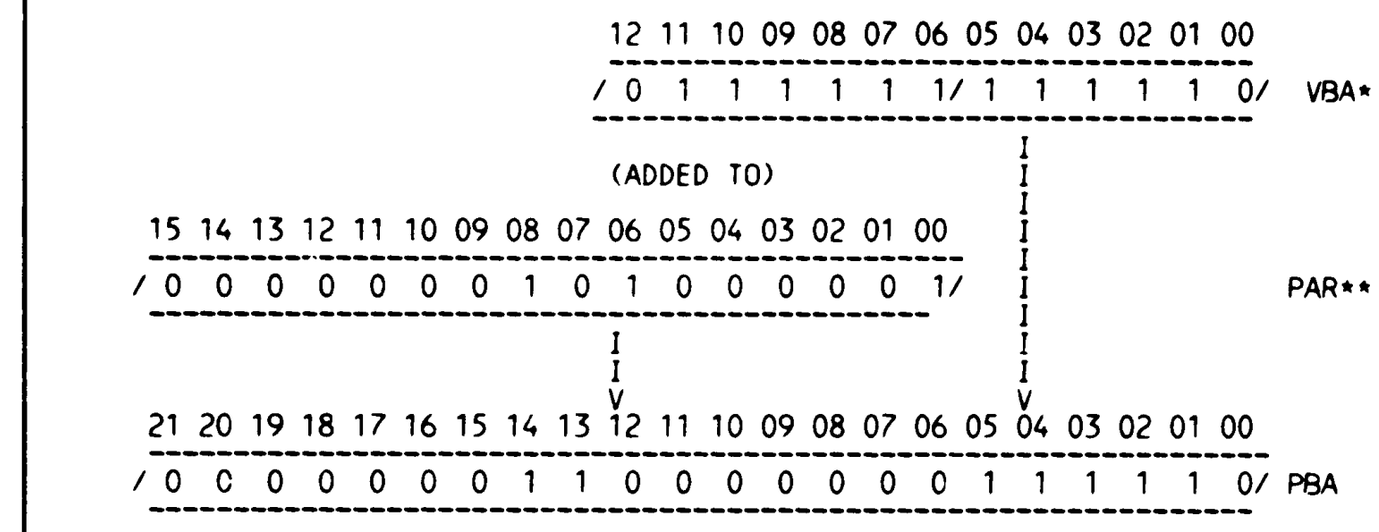
THE "T-BIT" (BIT 4) IN THE PROCESSOR STATUS WORD IS SET
BY AN "RTI" IN THE END-OF-PASS ROUTINE FOR EVERY OTHER PASS
BEGINNING WITH THF THIRD PASS (PASSES 3,5,7,9...). T-BIT
TRAPPING CAN BE INHIBITED BY SETTING BIT 12 = 1 IN THE SWITCH
REGISTER (SEE SECTION 2.4).

4.4 POWER FAILURE HANDLING

IF A POWER FAIL OCCURS (FOLLOWED BY A POWER UP), THE
MESSAGE "POWER FAILURE-RESTARTING" IS TYPED OUT AND
THE PROGRAM WILL RESTART EXECUTION AT "RFSTRT:"

4.5 PHYSICAL BUS ADDRESS CONSTRUCTION

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



* VBA BITS <15:13> SELECT THE APPROPRIATE PAR AND PDR
**= PSW MODE BIT 01 (BIT 15) SELECTS THE USER (=1) OR KERNEL (=0) SET OF PAR'S/PDR'S

4.6 RELOCATION THROUGHOUT MEMORY

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

CONSTANT	MAX. MEM.	CONSTANT	MAX. MEM.	CONSTANT	MAX. MEM.
0 OR 600	16K	3200	56K	5600	96K
1000	20K	3400	60K	6000	100K
1200	24K	3600	64K	6200	104K
1400	28K	4000	68K	6400	108K
1600	32K	4200	72K	6600	112K
2000	36K	4400	76K	7000	116K
2200	40K	4600	80K	7200	120K
2400	44K	5000	84K	7400	124K
2600	48K	5200	88K		
3000	52K	5400	92K		

5.0 PROGRAM DESCRIPTION

SEQ 0010

5.1 SUBROUTINES SED BY THIS PROGRAM

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

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

5.2 PROGRAM LISTING

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

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

5.3 USING THE PROGRAM TO DIAGNOSE A FAULT

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

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

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

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

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 18
 19                             .TITLE  CJKDAC0 KTF11-AA MMU DIAG
(1)                             ;*COPYRIGHT (C) NOV-79
(1)                             ;*DIGITAL EQUIPMENT CORP.
(1)                             ;*MAYNARD, MASS. 01754
(1)                             ;*
(1)                             ;*
(1)                             ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
(1)                             ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
(1)                             ;*
 20                             .SBTTL  OPERATIONAL SWITCH SETTINGS
(1)                             ;*
(1)                             ;*      SWITCH                  USE
(1)                             ;*      ------          --------------------
(1)                             ;*        15            HALT ON ERROR
(1)                             ;*        14            LOOP ON TEST
(1)                             ;*        13            INHIBIT ERROR TYPEOUTS
(1)                             ;*        12            INHIBIT TRACE TRAP
(1)                             ;*        11            INHIBIT ITERATIONS
(1)                             ;*        10            BELL ON ERROR
(1)                             ;*         9            LOOP ON ERROR
(1)                             ;*         8            LOOP ON TEST IN SWR<7:0>
 21                             .SBTTL  BASIC DEFINITIONS
(1)
(1)                             ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
(1)         001100              STACK=  1100
(1)                             .EQUIV  EMT,ERROR       ;;BASIC DEFINITION OF ERROR CALL
(1)                             .EQUIV  IOT,SCOPE       ;;BASIC DEFINITION OF SCOPE CALL
(1)
(1)                             ;*MISCELLANEOUS DEFINITIONS
(1)         000011              HT=     11              ;;CODE FOR HORIZONTAL TAB
(1)         000012              LF=     12              ;;CODE FOR LINE FEED
(1)         000015              CR=     15              ;;CODE FOR CARRIAGE RETURN
(1)         000200              CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
(1)         177776              PS=     177776          ;;PROCESSOR STATUS WORD
(1)                             .EQUIV  PS,PSW
(1)         177774              STKLMT= 177774          ;;STACK LIMIT REGISTER
(1)         177772              PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
(1)         177570              DSWR=   177570          ;;HARDWARE SWITCH REGISTER
(1)         177570              DDISP=  177570          ;;HARDWARE DISPLAY REGISTER
(1)
(1)                             ;*GENERAL PURPOSE REGISTER DEFINITIONS
(1)         000000              R0=     %0              ;;GENERAL REGISTER
(1)         000001              R1=     %1              ;;GENERAL REGISTER
(1)         000002              R2=     %2              ;;GENERAL REGISTER
(1)         000003              R3=     %3              ;;GENERAL REGISTER
(1)         000004              R4=     %4              ;;GENERAL REGISTER
(1)         000005              R5=     %5              ;;GENERAL REGISTER
(1)         000006              R6=     %6              ;;GENERAL REGISTER
(1)         000007              R7=     %7              ;;GENERAL REGISTER
(1)         000006              SP=     %6              ;;STACK POINTER
(1)         000007              PC=     %7              ;;PROGRAM COUNTER
(1)
(1)                             ;*PRIORITY LEVEL DEFINITIONS
(1)         000000              PR0=    0               ;;PRIORITY LEVEL 0
(1)         000040              PR1=    40              ;;PRIORITY LEVEL 1
```

```
(1)  000100  PR2=   100          ;;PRIORITY LEVEL 2
(1)  000140  PR3=   140          ;;PRIORITY LEVEL 3
(1)  000200  PR4=   200          ;;PRIORITY LEVEL 4
(1)  000240  PR5=   240          ;;PRIORITY LEVEL 5
(1)  000300  PR6=   300          ;;PRIORITY LEVEL 6
(1)  000340  PR7=   340          ;;PRIORITY LEVEL 7
(1)
(1)                              ;*''SWITCH REGISTER'' SWITCH DEFINITIONS
(1)  100000  SW15=  100000
(1)  040000  SW14=  40000
(1)  020000  SW13=  20000
(1)  010000  SW12=  10000
(1)  004000  SW11=  4000
(1)  002000  SW10=  2000
(1)  001000  SW09=  1000
(1)  000400  SW08=  400
(1)  000200  SW07=  200
(1)  000100  SW06=  100
(1)  000040  SW05=  40
(1)  000020  SW04=  20
(1)  000010  SW03=  10
(1)  000004  SW02=  4
(1)  000002  SW01=  2
(1)  000001  SW00=  1
(1)                              .EQUIV  SW09,SW9
(1)                              .EQUIV  SW08,SW8
(1)                              .EQUIV  SW07,SW7
(1)                              .EQUIV  SW06,SW6
(1)                              .EQUIV  SW05,SW5
(1)                              .EQUIV  SW04,SW4
(1)                              .EQUIV  SW03,SW3
(1)                              .EQUIV  SW02,SW2
(1)                              .EQUIV  SW01,SW1
(1)                              .EQUIV  SW00,SW0
(1)
(1)                              ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
(1)  100000  BIT15=  100000
(1)  040000  BIT14=  40000
(1)  020000  BIT13=  20000
(1)  010000  BIT12=  10000
(1)  004000  BIT11=  4000
(1)  002000  BIT10=  2000
(1)  001000  BIT09=  1000
(1)  000400  BIT08=  400
(1)  000200  BIT07=  200
(1)  000100  BIT06=  100
(1)  000040  BIT05=  40
(1)  000020  BIT04=  20
(1)  000010  BIT03=  10
(1)  000004  BIT02=  4
(1)  000002  BIT01=  2
(1)  000001  BIT00=  1
(1)                              .EQUIV  BIT09,BIT9
(1)                              .EQUIV  BIT08,BIT8
(1)                              .EQUIV  BIT07,BIT7
(1)                              .EQUIV  BIT06,BIT6
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```
(1)                             .EQUIV  BIT05,BIT5
(1)                             .EQUIV  BIT04,BIT4
(1)                             .EQUIV  BIT03,BIT3
(1)                             .EQUIV  BIT02,BIT2
(1)                             .EQUIV  BIT01,BIT1
(1)                             .EQUIV  BIT00,BIT0
(1)
(1)                             ;*BASIC ''CPU'' TRAP VECTOR ADDRESSES
(1)         000004              ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
(1)         000010              RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
(1)         000014              TBITVEC=14              ;;''T'' BIT
(1)         000014              TRTVEC= 14              ;;TRACE TRAP
(1)         000014              BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
(1)         000020              IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
(1)         000024              PWRVEC= 24              ;;POWER FAIL
(1)         000030              EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
(1)         000034              TRAPVEC=34              ;;''TRAP'' TRAP
(1)         000060              TKVEC=  60              ;;TTY KEYBOARD VECTOR
(1)         000064              TPVEC=  64              ;;TTY PRINTER VECTOR
(1)         000240              PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
 22                             .SBTTL  MEMORY MANAGEMENT DEFINITIONS
(1)
(1)                             ;*KT11 VECTOR ADDRESS
(1)
(1)         000250              MMVEC=  250
(1)
(1)                             ;*KT11 STATUS REGISTER ADDRESSES
(1)
(1)         177572              SR0=    177572
(1)         177574              SR1=    177574
(1)         177576              SR2=    177576
(1)         172516              SR3=    172516
(1)
(1)                             ;*USER ''I'' PAGE DESCRIPTOR REGISTERS
(1)
(1)         177600              UIPDR0= 177600
(1)         177602              UIPDR1= 177602
(1)         177604              UIPDR2= 177604
(1)         177606              UIPDR3= 177606
(1)         177610              UIPDR4= 177610
(1)         177612              UIPDR5= 177612
(1)         177614              UIPDR6= 177614
(1)         177616              UIPDR7= 177616
(1)
(1)                             ;*USER ''I'' PAGE ADDRESS REGISTERS
(1)
(1)         177640              UIPAR0= 177640
(1)         177642              UIPAR1= 177642
(1)         177644              UIPAR2= 177644
(1)         177646              UIPAR3= 177646
(1)         177650              UIPAR4= 177650
(1)         177652              UIPAR5= 177652
(1)         177654              UIPAR6= 177654
(1)         177656              UIPAR7= 177656
(1)
(1)                             ;*KERNEL ''I'' PAGE DESCRIPTOR REGISTERS
```

```
(1)
(1)             172300                  KIPDR0= 172300
(1)             172302                  KIPDR1= 172302
(1)             172304                  KIPDR2= 172304
(1)             172306                  KIPDR3= 172306
(1)             172310                  KIPDR4= 172310
(1)             172312                  KIPDR5= 172312
(1)             172314                  KIPDR6= 172314
(1)             172316                  KIPDR7= 172316
(1)
(1)                                     ;*KERNEL ''I'' PAGE ADDRESS REGISTERS
(1)
(1)             172340                  KIPAR0= 172340
(1)             172342                  KIPAR1= 172342
(1)             172344                  KIPAR2= 172344
(1)             172346                  KIPAR3= 172346
(1)             172350                  KIPAR4= 172350
(1)             172352                  KIPAR5= 172352
(1)             172354                  KIPAR6= 172354
(1)             172356                  KIPAR7= 172356
(1)
 23                                             .EQUIV  SP,KSP
 24                                             .EQUIV  SP,USP
 25                                             .EQUIV  BIT4,TBIT
 26                                             .EQUIV  BIT6,WBIT
 27             001100                         KERSTK= STACK
 28             000700                         USESTK= STACK-200
 29
 30                                     ;*ADDITIONAL DEFINITIONS
 31                                     ;*
 32
256
258                                     .SBTTL  TRAP CATCHER
(1)
(1)             000000                          .=0
(1)                                     ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ''.+2,HALT''
(1)                                     ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
(1)                                     ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
(1)             000174                  .=174
(1)  000174     000000                  DISPREG: .WORD  0               ;;SOFTWARE DISPLAY REGISTER
(1)  000176     000000                  SWREG:   .WORD  0               ;;SOFTWARE SWITCH REGISTER
(1)                                     .SBTTL  STARTING ADDRESS(ES)
(1)  000200  000137  020000             JMP     @#START ;;JUMP TO STARTING ADDRESS OF PROGRAM
259                                     .SBTTL  ACT11 HOOKS
(1)
(2)                                     ;;*****************************************************************
(1)                                     ;HOOKS REQUIRED BY ACT11
(1)             000204                  $SVPC=.                         ;SAVE PC
(1)             000046                  .=46
(1)  000046     034020                  $ENDAD                          ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
(1)             000052                  .=52
(1)  000052     000000                  .WORD   0                       ;;2)SET LOC.52 TO ZERO
(1)             000204                  .=$SVPC                         ;; RESTORE PC
260                                     .SBTTL  APT PARAMETER BLOCK
(1)
(2)                                     ;;*****************************************************************
```

```
(1)                                 ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
(2)                                 ;;*****************************************************************
(1)          000204                         .$X=.    ;;SAVE CURRENT LOCATION
(1)          000024                         .=24     ;;SET POWER FAIL TO POINT TO START OF PROGRAM
(1)  000024  000200                         200      ;;FOR APT START UP
(1)          000044                         .=44     ;;POINT TO APT INDIRECT ADDRESS PNTR.
(1)  000044  000204                         $APTHDR  ;;POINT TO APT HEADER BLOCK
(1)          000204                         .=.$X    ;;RESET LOCATION COUNTER
(2)                                 ;;*****************************************************************
(1)                                 ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
(1)                                 ;INTERFACE SPEC.
(1)
(1)  000204                         $APTHD:
(1)  000204  000000                 $HIBTS: .WORD   0        ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
(1)  000206  001226                 $MBADR: .WORD   $MAIL    ;;ADDRESS OF APT MAILBOX (BITS 0-15)
(1)  000210  000014                 $TSTM:  .WORD   14       ;;RUN TIM OF LONGEST TEST
(1)  000212  000020                 $PASTM: .WORD   20       ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
(1)  000214  000005                 $UNITM: .WORD   5        ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
(1)  000216  000016                         .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```

```
261                                     .SBTTL  COMMON TAGS
(1)
(2)                                     ;;**********************************************************************
(1)                                     ;*THIS TABLE CONTAINS VARIOUS COMMON STORAGE LOCATIONS
(1)                                     ;*USED IN THE PROGRAM.
(1)
(1)                 001100              .=1100
(1)  001100                 $CMTAG:                         ;;START OF COMMON TAGS
(1)  001100  000000                     .WORD   0
(1)  001102     000         $TSTNM: .BYTE   0               ;;CONTAINS THE TEST NUMBER
(1)  001103     000         $ERFLG: .BYTE   0               ;;CONTAINS ERROR FLAG
(1)  001104  000000         $ICNT:  .WORD   0               ;;CONTAINS SUBTEST ITERATION COUNT
(1)  001106  000000         $LPADR: .WORD   0               ;;CONTAINS SCOPE LOOP ADDRESS
(1)  001110  000000         $LPERR: .WORD   0               ;;CONTAINS SCOPE RETURN FOR ERRORS
(1)  001112  000000         $ERTTL: .WORD   0               ;;CONTAINS TOTAL ERRORS DETECTED
(1)  001114     000         $ITEMB: .BYTE   0               ;;CONTAINS ITEM CONTROL BYTE
(1)  001115     001         $ERMAX: .BYTE   1               ;;CONTAINS MAX. ERRORS PER TEST
(1)  001116  000000         $ERRPC: .WORD   0               ;;CONTAINS PC OF LAST ERROR INSTRUCTION
(1)  001120  000000         $GDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'GOOD' DATA
(1)  001122  000000         $BDADR: .WORD   0               ;;CONTAINS ADDRESS OF 'BAD' DATA
(1)  001124  000000         $GDDAT: .WORD   0               ;;CONTAINS 'GOOD' DATA
(1)  001126  000000         $BDDAT: .WORD   0               ;;CONTAINS 'BAD' DATA
(1)  001130  000000                 .WORD   0               ;;RESERVED--NOT TO BE USED
(1)  001132  000000                 .WORD   0
(1)  001134     000         $AUTOB: .BYTE   0               ;;AUTOMATIC MODE INDICATOR
(1)  001135     000         $INTAG: .BYTE   0               ;;INTERRUPT MODE INDICATOR
(1)  001136  000000                 .WORD   0
(1)  001140  177570         SWR:    .WORD   DSWR            ;;ADDRESS OF SWITCH REGISTER
(1)  001142  177570         DISPLAY: .WORD  DDISP           ;;ADDRESS OF DISPLAY REGISTER
(1)  001144  177560         $TKS:   177560                  ;;TTY KBD STATUS
(1)  001146  177562         $TKB:   177562                  ;;TTY KBD BUFFER
(1)  001150  177564         $TPS:   177564                  ;;TTY PRINTER STATUS REG. ADDRESS
(1)  001152  177566         $TPB:   177566                  ;;TTY PRINTER BUFFER REG. ADDRESS
(1)  001154     000         $NULL:  .BYTE   0               ;;CONTAINS NULL CHARACTER FOR FILLS
(1)  001155     002         $FILLS: .BYTE   2               ;;CONTAINS # OF FILLER CHARACTERS REQUIRED
(1)  001156     012         $FILLC: .BYTE   12              ;;INSERT FILL CHARS. AFTER A 'LINE FEED''
(1)  001157     000         $TPFLG: .BYTE   0               ;;'TERMINAL AVAILABLE'' FLAG (BIT<07>=0=YES)
(1)  001160  000000         $REGAD: .WORD   0               ;;CONTAINS THE ADDRESS FROM
(1)                                                         ;;WHICH  ($REG0) WAS OBTAINED
(3)  001162  000000         $REG0:  .WORD   0               ;;CONTAINS (($REGAD)+0)
(3)  001164  000000         $REG1:  .WORD   0               ;;CONTAINS (($REGAD)+2)
(3)  001166  000000         $REG2:  .WORD   0               ;;CONTAINS (($REGAD)+4)
(3)  001170  000000         $REG3:  .WORD   0               ;;CONTAINS (($REGAD)+6)
(3)  001172  000000         $REG4:  .WORD   0               ;;CONTAINS (($REGAD)+10)
(3)  001174  000000         $REG5:  .WORD   0               ;;CONTAINS (($REGAD)+12)
(3)  001176  000000         $TMP0:  .WORD   0               ;;USER DEFINED
(3)  001200  000000         $TMP1:  .WORD   0               ;;USER DEFINED
(3)  001202  000000         $TMP2:  .WORD   0               ;;USER DEFINED
(3)  001204  000000         $TMP3:  .WORD   0               ;;USER DEFINED
(3)  001206  000000         $TMP4:  .WORD   0               ;;USER DEFINED
(3)  001210  000000         $TMP5:  .WORD   0               ;;USER DEFINED
(1)  001212  000000         $TIMES: 0                       ;;MAX. NUMBER OF ITERATIONS
(1)  001214  000000         $ESCAPE:0                       ;;ESCAPE ON ERROR ADDRESS
(1)  001216  177607  000377 $BELL:  .ASCIZ  <207><377><377> ;;CODE FOR BELL
(1)  001222     077         $QUES:  .ASCII  /?/             ;;QUESTION MARK
(1)  001223     015         $CRLF:  .ASCII  <15>            ;;CARRIAGE RETURN
```

```
(1)  001224  000012                $LF:    .ASCIZ  <12>            ;;LINE FEED
(2)                                ;;*****************************************************************
(2)                                .SBTTL  APT MAILBOX-ETABLE
(2)
(3)                                ;;*****************************************************************
(2)                                .EVEN
(2)  001226                        $MAIL:                          ;;APT MAILBOX
(2)  001226  000000                $MSGTY: .WORD   AMSGTY  ;;MESSAGE TYPE CODE
(2)  001230  000000                $FATAL: .WORD   AFATAL  ;;FATAL ERROR NUMBER
(2)  001232  000000                $TESTN: .WORD   ATESTN  ;;TEST NUMBER
(2)  001234  000000                $PASS:  .WORD   APASS   ;;PASS COUNT
(2)  001236  000000                $DEVCT: .WORD   ADEVCT  ;;DEVICE COUNT
(2)  001240  000000                $UNIT:  .WORD   AUNIT   ;;I/O UNIT NUMBER
(2)  001242  000000                $MSGAD: .WORD   AMSGAD  ;;MESSAGE ADDRESS
(2)  001244  000000                $MSGLG: .WORD   AMSGLG  ;;MESSAGE LENGTH
(2)  001246                        $ETABLE:                        ;;APT ENVIRONMENT TABLE
(2)  001246     000                $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
(2)  001247     000                $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
(2)  001250  000000                $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
(2)  001252  000000                $USWR:  .WORD   AUSWR   ;;USER SWITCHES
(2)  001254  000000                $CPUOP: .WORD   ACPUOP  ;;CPU TYPE,OPTIONS
(2)                                ;*                      BITS 15-11=CPU TYPE
(2)                                ;*                              11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
(2)                                ;*                              11/70=06,PDQ=07,Q=10
(2)                                ;*                      BIT 10=REAL TIME CLOCK
(2)                                ;*                      BIT  9=FLOATING POINT PROCESSOR
(2)                                ;*                      BIT  8=MEMORY MANAGEMENT
(2)  001256     000                $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
(2)  001257     000                $MTYP1: .BYTE   AMTYP1  ;;MEM. TYPE,BLK#1
(2)                                ;*                      MEM.TYPE BYTE   --  (HIGH BYTE)
(2)                                ;*                              900 NSEC CORE=001
(2)                                ;*                              300 NSEC BIPOLAR=002
(2)                                ;*                              500 NSEC MOS=003
(2)  001260  000000                $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
(2)                                ;*                        MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF 'TYPE'' ABOVE
(2)  001262                        $ETEND:
(2)                                .MEXIT
(3)
(3)  001262  000000                TESTNO: .WORD   0               ;HOLDS TEST NUMBER FOR TYPEOUTS
(3)  001264  000000                WASR6:  .WORD   0               ;USED TO STORE THE STACK POINTER AFTER A TRAP
(3)  001266  000000                TRAPPC: .WORD   0               ;USED TO STORE THE PC OF A TRAP OR ABORT
(3)  001270  000000                TRAPPS: .WORD   0               ;USED TO STORE THE PS OF A TRAP OR ABORT
(3)  001272  000000                WASSR0: .WORD   0               ;USED TO STORE CONTENTS OF SR0
(3)  001274  000000                WASSR2: .WORD   0               ;USED TO STORE CONTENTS OR SR2
(3)  001276  000000                TBITPS: .WORD   0               ;SAVES THE PSW THAT MAY HAVE ITS T-BIT ON
(3)  001300  000000                ANDADR: .WORD   0               ;HOLDS RESULT OF ADDRESSES BEING AND-ED
(3)  001302  000000                ORADR:  .WORD   0               ;HOLDS RESULT OF ADDRESSES BEING OR-ED
(3)  001304  000000                TONUM:  .WORD   0               ;HOLDS NUMBER OF TIME-OUTS
(3)  001306  000000                VIRT1:  .WORD   0               ;HOLDS VIRTUAL ADDRESS TO BE CONVERTED
(3)  001310  000000                VIRT2:  .WORD   0               ;   ''       ''      ''
(3)  001312  000000                PBALO:  .WORD   0               ;HOLDS BITS <15:00> OF PHYSICAL ADDRESS
(3)  001314  000000                PBAHI:  .WORD   0               ;HOLDS BITS <17:16> OF PHYSICAL ADDRESS
```

```
(1)                                 .SBTTL  ERROR POINTER TABLE
(1)
(1)                                 ;*THIS TABLE CONTAINS THE INFORMATION FOR EACH ERROR THAT CAN OCCUR.
(1)                                 ;*THE INFORMATION IS OBTAINED BY USING THE INDEX NUMBER FOUND IN
(1)                                 ;*LOCATION $ITEMB. THIS NUMBER INDICATES WHICH ITEM IN THE TABLE IS PERTINENT.
(1)                                 ;*NOTE1:        IF $ITEMB IS 0 THE ONLY PERTINENT DATA IS ($ERRPC).
(1)                                 ;*NOTE2:        EACH ITEM IN THE TABLE CONTAINS 4 POINTERS EXPLAINED AS FOLLOWS:
(1)
(1)                                 ;*      EM              ;;POINTS TO THE ERROR MESSAGE
(1)                                 ;*      DH              ;;POINTS TO THE DATA HEADER
(1)                                 ;*      DT              ;;POINTS TO THE DATA
(1)                                 ;*      DF              ;;POINTS TO THE DATA FORMAT
(1)
(1)
(1)  001316                         $ERRTB:
262
263                                 ;*ITEM 1
264  001316  040724                        EM1                     ;UNEXPECTED CPU TRAP TO LOC. 004
265  001320  044015                        DH1                     ;OLD PC  OLD PSW R6 WAS  TESTNO  ERRORPC
266  001322  047222                        DT1                     ;TRAPPC, TRAPPS, WASR6, TESTNO, $ERPPC, 0
267  001324  050032                        DF1                     ;0,0,0,0,0
268
269                                 ;*ITEM 2
270  001326  040764                        EM2                     ;UNEXPECTED MEM. MGMT. TRAP TO LOC. 250
271  001330  044065                        DH2                     ;OLD PC  OLD PSW R6 WAS  SR0     SR2     TESTNO  ERRORPC
272  001332  047236                        DT2                     ;TRAPPC, TRAPPS, WASR6, WASSR0, WASSR2, TESTNO, $ERRPC,
273  001334  050037                        DF2                     ;0,0,0,0,0,0,0
274
275                                 ;*ITEM 3
276  001336  041033                        EM3                     ;PRIORITY BITS SET WRONG IN PSW
277  001340  044155                        DH3                     ;WROTE   READ    TESTNO  ERRORPC
278  001342  047256                        DT3                     ;$REG0,$REG1,TESTNO,$ERRPC,0
279  001344  050046                        DF3                     ;0,0,0,0
280
281                                 ;*ITEM 4
282  001346  041072                        EM4                     ;MODE BITS SET WRONG IN PSW
283  001350  044155                        DH3                     ;WROTE   READ    TESTNO  ERRORPC
284  001352  047256                        DT3                     ;$REG0,$REG1,TESTNO,$ERRPC,0
285  001354  050046                        DF3                     ;0,0,0,0
286
287                                 ;*ITEM 5
288  001356  041125                        EM5                     ;DUAL ADDRESSING BETWEEN HI&LO BYTES OF PSW
289  001360  044155                        DH3                     ;WROTE   READ    TESTNO  ERRORPC
290  001362  047256                        DT3                     ;$REG0,$REG1,TESTNO,$ERRPC,0
291  001364  050046                        DF3                     ;0,0,0,0
292
293                                 ;*ITEM 6
294  001366  041200                        EM6                     ;KERNEL R6 CHANGED BY WRITING USER R6
295  001370  044155                        DH3                     ;WROTE   READ    TESTNO  ERRORPC
296  001372  047256                        DT3                     ;$REG0,$REG1,TESTNO,$ERRPC,0
297  001374  050046                        DF3                     ;0,0,0,0
298
299                                 ;*ITEM 7
300  001376  041245                        EM7                     ;A MEMORY MGMT. REG. TIMED OUT
301  001400  044215                        DH7                     ;ADDRESS TESTNO  ERRORPC
302  001402  047270                        DT7                     ;$REG0,TESTNO,$ERRPC,0
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303  001404  050052                    DF7                 ;0,0,0
304
305                                  ;*ITEM 10
306  001406  041303                    EM10                ;SUMMARY OF MEM. MGMT. REG. TIMEOUTS
307  001410  044245                    DH10                ;REGISTER-ADDRS  NUM. OF
308                                                         ;AND-ED  OR-ED   TIMOUTS TESTNO ERRORPC
309  001412  047300                    DT10                ;ANDADR,ORADR,TONUM,TESTNO,$ERRPC,0
310  001414  050055                    DF10                ;0,0,1,0,0
311
312                                  ;*ITEM 11
313  001416  041347                    EM11                ;MEM. MGMT. REG. WOULD NOT CLEAR
314  001420  044345                    DH11                ;REGISTR READ    READ-(BINARY)
315                                                         ;ADDRESS (OCTAL) 5432109876543210  TESTNO  ERRORPC
316  001422  047314                    DT11                ;$REG0,$REG1,$REG1,TESTNO,$ERRPC,0
317  001424  050062                    DF11                ;0,0,^,0,0
318
319                                  ;*ITEM 12
320  001426  041407                    EM12                ;MEM. MGMT. REG. BITS NOT SET CORRECTLY
321  001430  044465                    DH12                ;REGISTR WROTE   READ    READ
322                                                         ;ADDRESS (OCTAL) (OCTAL) (BINARY) TESTNO ERRORPC
323  001432  047330                    DT12                ;$REG0,$REG1,$REG2,$REG2,TESTNO,$ERRPC,0
324  001434  050067                    DF12                ;0,0,0,2,0,0
325
326                                  ;*ITEM 13
327  001436  041456                    EM13                ;SR0 EFFECTED BY WRITE TO PSW
328  001440  044625                    DH13                ;READ    TESTNO  ERRORPC
329  001442  047346                    DT13                ;$REG0,TESTNO,$ERRPC,0
330  001444  050075                    DF13                ;0,0,0
331
332                                  ;*ITEM 14
333  001446  041513                    EM14                ;SR1 DID NOT READ ALL ZEROS
334  001450  044625                    DH13                ;READ    TESTNO  ERRORPC
335  001452  047346                    DT13                ;$REG0,TESTNO,$ERRPC,0
336  001454  050075                    DF13                ;0,0,0
337
338                                  ;*ITEM 15
339  001456  041546                    EM15                ;DUAL ADDRESSING BETWEEN BYTES OF PAR OR PDR
340  001460  044465                    DH12                ;REGISTER WROTE   READ    READ
341                                                         ;ADDRESS (OCTAL) (OCTAL) (BINARY) TESTNO  ERRORPC
342  001462  047330                    DT12                ;$REG0,$REG1,$REG2,$REG2,TESTNO,$ERRPC,0
343  001464  050067                    DF12                ;0,0,0,2,0,0
344
345                                  ;*ITEM 16
346  001466  041622                    EM16                ;DUAL ADDRESSING BETWEEN PAR-PDR'S
347  001470  044655                    DH16                ;PAR-PDR PAR-PDR
348                                                         ;CLEARED EFFECTD EXPECTD RECEIVD TESTNO ERRORPC
349  001472  047356                    DT16                ;$REG0,$REG1,$REG5,$REG2,TESTNO,$ERRPC,0
350  001474  050100                    DF16                ;0,0,0,0,0,0
351
352                                  ;*ITEM 17
353  001476  041664                    EM17                ;PHYS. ADDR. FORMED READ WRONG
354  001500  044755                    DH17                ;PHYSICAL VIRTUAL
355                                                         ;ADDRESS ADDRESS KIPAR4  TESTNO  ERRORPC
356  001502  047374                    DT17                ;PBALO,VIRT1,$REG4,TESTNO,$ERRPC,0
357  001504  050106                    DF17                ;3,0,0,0,0
358
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                                ;*ITEM 20
001506  041722                          EM20            ;PHYS. ADDR. FORMED READ WRONG IN RELOCATE MODE
001510  045045                          DH20            ;PHYSICL PAR 4   PAR 5
                                                        ;ADDRESS VBA     VBA     PAR 4   PAR 5   PSW     TESTNO
001512  047410                          DT20            ;PBALO,VIRT1,VIRT2,$REG4,$REG5,$TMP0,TESTNO,$ERRPC,0
001514  050113                          DF20            ;3,0,0,0,0,0,0,0

                                ;*ITEM 21
001516  041774                          EM21            ;W-BIT DID NOT GET SET IN PDR
001520  045173                          DH21            ;PDR     VIRTUAL
                                                        ;TESTED  ADDRESS TESTNO  ERRORPC
001522  047432                          DT21            ;$REG5,$REG3,TESTNO,$ERRPC,0
001524  050123                          DF21            ;0,0,0,0

                                ;*ITEM 22
001526  042031                          EM22            ;W-BIT SET IN MORE THAN ONE PDR
001530  045253                          DH22            ;PDR IN  PDR     VIRTUAL
                                                        ;ERROR   TESTED  ADDRESS TESTNO  ERRORPC
001532  047444                          DT22            ;$REG0,$REG5,$REG3,TESTNO,$ERRPC,0
001534  050127                          DF22            ;0,0,0,0,0

                                ;*ITEM 23
001536  042070                          EM23            ;W-BIT NOT CLEARED BY WRITING TO PDR
001540  045352                          DH23            ;PDR     TESTNO  ERRORPC
001542  047460                          DT23            ;$REG5,TESTNO,$ERRPC,0
001544  050134                          DF23            ;0,0,0

                                ;*ITEM 24
001546  042134                          EM24            ;WRITING SR0 SET W-BIT IN KIPDR7
001550  045402                          DH24            ;PDR WAS EXPECTD TESTNO  ERRORPC
001552  047470                          DT24            ;$REG2,$REG1,TESTNO,$ERRPC,0
001554  050137                          DF24            ;0,0,0,0

                                ;*ITEM 25
001556  042174                          EM25            ;W-BIT GOT SET DURING TIMEOUT ABORT
001560  045402                          DH24            ;PDR WAS EXPECTD TESTNO  ERRORPC
001562  047470                          DT24            ;$REG2,$REG1,TESTNO,$ERRPC,0
001564  050137                          DF24            ;0,0,0,0

                                ;*ITEM 26
001566  042237                          EM26            ;MEMORY MGMT. ACCESS ABORT DID NOT OCCUR
001570  045442                          DH26            ;PDR 4   PSW     TESTNO  ERRORPC
001572  047502                          DT26            ;$REG2,$TMP0,TESTNO,$ERRPC,0
001574  050137                          DF24            ;0,0,0,0

                                ;*ITEM 27
001576  042307                          EM27            ;ACCESS ERROR DID NOT ABORT INSTRUCTION
001600  045442                          DH26            ;PDR 4   PSW     TESTNO  ERRORPC
001602  047502                          DT26            ;$REG2,$TMP0,TESTNO,$ERRPC,0
001604  050137                          DF24            ;0,0,0,0

                                ;*ITEM 30
001606  042356                          EM30            ;SR0 DID NOT REPORT ACCESS ERROR CORRECTLY
001610  045502                          DH30            ;SR0 WAS EXPECTD PDR 4   PSW     TESTNO ERRORPC
001612  047514                          DT30            ;WASSR0,$REG3,$REG2,$TMP0,TESTNO,$ERRPC,0
001614  050143                          DF30            ;0,0,0,0,0,0
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                                ;*ITEM 31
001616  042430                          EM31        ;SR2 DID NOT LOCKUP CORRECT VIPTUAL ADDR.
001620  045562                          DH31        ;SR2 WAS EXPECTD PDR 4   PSW     TESTNO ERRORPC
001622  047532                          DT31        ;WASSR2,$REG4,$REG2,$TMP0,TESTNO,$ERRPC,0
001624  050143                          DF30        ;0,0,0,0,0,0

                                ;*ITEM 32
001626  042475                          EM32        ;PAGE LGTH. ABORT OCCURRED WHEN IT SHOULDN'T HAVE
001630  045642                          DH32        ;V.B.A.  KIPDR4  SR0 WAS SR2 WAS TESTNO  ERRORPC
001632  047550                          DT32        ;$REG0,$REG4,WASSR0,WASSR2,TESTNO,$ERRPC,0
001634  050143                          DF30        ;0,0,0,0,0,0

                                ;*ITEM 33
001636  042556                          EM33        ;PAGE LGTH. ABORT DID NCT OCCUR WHEN IT SHOULD HAVE
001640  045722                          DH33        ;V.B.A.  KIPDR4  TESTNO  ERRORPC
001642  047566                          DT33        ;$REG0,$REG4,TESTNO,$ERRPC,0
001644  050137                          DF24        ;0,0,0,0

                                ;*ITEM 34
001646  042641                          EM34        ;SR0 DID NOT REPORT PAGE LGTH. ABORT CORRECTLY
001650  045762                          DH34        ;V.B.A.  KIPDR4  SR0 WAS EXPECTD TESTNO  ERRORPC
001652  047600                          DT34        ;$REG0,$REG4,WASSR0,$REG2,TESTNO,$ERRPC,0
001654  050143                          DF30        ;0,0,0,0,0,0
                                ;*ITEM 35
001656  042430                          EM31        ;SR2 DID NOT LOCKUP CORRECT VIRUAL ADDR.
001660  046042                          DH35        ;V.B.A.  KIPDR4  SR2 WAS EXPECTD TESTNO  ERRORPC
001662  047616                          DT35        ;$REG0,$REG4,WASSR2,$REG3,TESTNO,$ERRPC,0
001664  050143                          DF30        ;0,0,0,0,0,0

                                ;*ITEM 36
001666  042430                          EM31        ;SR2 DID NOT LOCKUP CORRECT VIRUAL ADDR.
001670  046122                          DH36        ;SR2 WAS EXPECTD TESTNO  ERRORPC
001672  047634                          DT36        ;WASSR2,$REG1,TESTNO,$ERRPC,0
001674  050137                          DF24        ;0,0,0,0

                                ;*ITEM 37
001676  042717                          EM37        ;SR0 OR SR2 CHANGED BY A SECOND ABORT
001700  046162                          DH37        ;FIRST ABORT     SECOND ABORT
                                                    ;SR0 WAS SR2 WAS SR0 WAS SR2 WAS TESTNO  ERRORPC
001702  047646                          DT37        ;$TMP0,$TMP2,WASSR0,WASSR2,TESTNO,$ERRPC,0
001704  050143                          DF30        ;0,0,0,0,0,0

                                ;*ITEM 40
001706  042764                          EM40        ;SR0 OR SR2 WAS NOT 'RESET'' BY A RESET
001710  046277                          DH40        ;SR0 WAS SR2 WAS TESTNO  ERRORPC
001712  047664                          DT40        ;WASSR0,WASSR2,TESTNO,$ERRPC,0
001714  050137                          DF24        ;0,0,0,0

                                ;*ITEM 41
001716  043033                          EM41        ;SR2 NOT TRACKING CORRECTLY
001720  046122                          DH36        ;SR2 WAS EXPECTD TESTNO  ERROPC
001722  047634                          DT36        ;WASSR2,$REG1,TESTNO,$ERRPC,0
001724  050137                          DF24        ;0,0,0,0

                                ;*ITEM 42
```

```
                                        EM42            ;DID NOT TRAP THRU KERNEL SPACE
                                        DH42            ;PSW WAS R6 WAS  TESTNO  ERRORPC
                                        DT42            ;$REG1,$REG2,TESTNO,$ERRPC,0
                                        DF24            ;0,0,0,0

                                ;*ITEM 43
                                        EM43            ;KT ERROR NOT SERVICED ON TIMEOUT ERROR
                                        DH23            ;PDR     TESTNO  ERRORPC
                                        DT23            ;$REG5,TESTNO,$ERRPC,0
                                        DF23            ;0,0,0

                                ;*ITEM 44

                                        EM44            ;SR0 OR SR2 CHANGED BY TIMEOUT ERROR
                                        DH44            ;EXPECTED        RECEIVED
                                                        ;SR0     SR2     SR0 WAS SR2 WAS TESTNO  ERRORPC
                                        DT44            ;$REG0,$REG1,WASSR0,WASSR2,TESTNO,$ERRPC,0
                                        DF30            ;0,0,0,0,0,0

                                ;*ITEM 45
                                        EM45            ;ERROR DURING 'DOUBLE ERROR'' (KT & ODD ADDR.)
                                        DH45            ;EXPECTED:
                                                        ;PSW     PC        SR0     SR2
                                                        ;170017  (3$+4)  020147  (3$)
                                                        ;RECEIVED
                                                        ;PSW     PC        SR0     SR2     TESTNO  ERRORPC
                                        DT45            ;$REG1,$REG3,WASSR0,WASSR2,TESTNO,$ERRPC,0
                                        DF30            ;0,0,0,0,0,0

                                ;*ITEM 46
                                        EM46            ;MFPI INSTRUCTION PUSHED WRONG DATA
                                        DH46            ;DATA    DATA
                                                        ;EXPECTD RECEIVD TESTNO  ERRORPC
                                        DT46            ;$REG0,$REG1,TESTNO,$ERRPC,0
                                        DF46            ;0,0,0,0

                                ;*ITEM 47
                                        EM47            ;MTPI INSTRUCTION LOADED WRONG DATA
                                        DH46            ;DATA    DATA
                                                        ;EXPECTD RECEIVD TESTNO  ERRORPC
                                        DT46            ;$REG0,$REG1,TESTNO,$ERRPC,0
                                        DF46            ;0,0,0,0

                                ;*ITEM 50
                                        EM50            ;STACK NOT PUSHED BY MFPI-MTPI
                                        DH50            ;TESTNO  ERRORPC
                                        DT50            ;TESTNO,$ERRPC,0
                                        DF50            ;0,0

                                ;*ITEM 51
                                        EM51            ;KERNEL PAGE ACCESSED INSTEAD OF USER: MFPI-MTPI
                                        DH51            ;SR0 WAS SR2 WAS TESTNO  ERRORPC
                                        DT51            ;WASSR0,WASSR2,TESTNO,$ERRPC,0
                                        DF51            ;0,0,0,0

                                ;*ITEM 52
```

```
527  002026  043535                    EM52    ;WRONG PDR'S REFERENCED WHILE IN RELOCATE MODE
528  002030  047043                    DH52    ;PHYSICL PAR 4
529                                             ;ADDRESS V.B.A.  PAR 4   SR0 WAS SR2 WAS PSW    TESTNO
530  002032  047776                    DT52    ;PBALO,VIRT1,$REG4,WASSR0,WASSR2,$TMP0,TESTNO,$ERRPC,0
531  002034  050163                    DF52    ;3,0,0,0,0,0,0,0
532                              ;*ITEM 53
533  002036  043613                    EM53    ;MFPD INSTRUCTION PUSHED WRONG DATA
534  002040  046706                    DH46    ;DATA    DATA
535                                             ;EXPECTD RECEIVD TESTNO  ERRORPC
536  002042  047744                    DT46    ;$REG0,$REG1,TESTNO,$ERRPC,0
537  002044  050151                    DF46    ;0,0,0,0
538
539                              ;*ITEM 54
540  002046  043656                    EM54    ;STACK NOT PUSHED BY MFPD-MTPD
541  002050  046763                    DH50    ;TESTNO  ERRORPC
542  002052  047756                    DT50    ;TESTNO,$ERRPC,0
543  002054  050155                    DF50    ;0,0
544
545                              ;*ITEM 55
546  002056  043714                    EM55    ;PAR OR PDR WAS CHANGED BY A RESET
547  002060  044345                    DH11    ;REGISTR READ    READ-(BINARY)
548                                             ;ADDRESS (OCTAL) 5432109876543210  TESTNO  ERRORPC
549  002062  047314                    DT11    ;$REG0,$REG1,$REG1,TESTNO,$ERRPC,0
550  002064  050062                    DF11    ;0,0,2,0,0
551
552                              ;*ITEM 56
553  002066  043752                    EM56    ;PSW CHANGED BY AN RTI  IN USER MODE
554  002070  047161                    DH56    ;PSW WAS EXPECTD TESTNO  ERRORPC
555  002072  050020                    DT56    ;$REG1,$REG2,TESTNO,$ERRPC,0
556  002074  050173                    DF56    ;0,0,0,0
557
558
```

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

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


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

```
  616  002232  013746  001270          MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
  617  002236  013746  001266          MOV     TRAPPC,-(KSP)
  618  002242  000006                  RTT                     ;RETURN FROM INTERRUPT OR ABORT.
  619
```

```
                                        .SBTTL
                                        .SBTTL  *****   STARTING POINT OF TEST  *****
                                        .SBTTL  *****   STARTING ADDRESS OF 200 *****
                 020000                 .=20000

 020000                          START:
                                 .SBTTL  INITIALIZE THE COMMON TAGS
                                 ;;CLEAR THE COMMON TAGS ($CMTAG) AREA
 020000  012706  001100                  MOV     #$CMTAG,R6      ;;FIRST LOCATION TO BE CLEARED
 020004  005026                          CLR     (R6)+           ;;CLEAR MEMORY LOCATION
 020006  022706  001140                  CMP     #SWR,R6 ;;DONE?
 020012  001374                          BNE     .-6             ;;LOOP BACK IF NO
 020014  012706  001100                  MOV     #STACK,SP       ;;SETUP THE STACK POINTER
                                 ;;INITIALIZE A FEW VECTORS
 020020  012737  034136  000020          MOV     #$SCOPE,@#IOTVEC ;;IOT VECTOR FOR SCOPE ROUTINE
 020026  012737  000340  000022          MOV     #340,@#IOTVEC+2 ;;LEVEL 7
 020034  012737  034416  000030          MOV     #$ERROR,@#EMTVEC ;;EMT VECTOR FOR ERROR ROUTINE
 020042  012737  000340  000032          MOV     #340,@#EMTVEC+2 ;;LEVEL 7
 020050  012737  040410  000034          MOV     #$TRAP,@#TRAPVEC ;;TRAP VECTOR FOR TRAP CALLS
 020056  012737  000340  000036          MOV     #340,@#TRAPVEC+2;LEVEL 7
 020064  012737  040476  000024          MOV     #$PWRDN,@#PWRVEC ;;POWER FAILURE VECTOR
 020072  012737  000340  000026          MOV     #340,@#PWRVEC+2 ;;LEVEL 7
 020100  013737  033650  033642          MOV     $ENDCT,$EOPCT   ;;SETUP END-OF-PROGRAM COUNTER
 020106  005037  001212                  CLR     $TIMES          ;;INITIALIZE NUMBER OF ITERATIONS
 020112  005037  001214                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE ON ERROR ADDRESS
 020116  112737  000001  001115          MOVB    #1,$ERMAX       ;;ALLOW ONE ERROR PER TEST
                                 ;;INITIALIZE THE ''T-BIT'' TRAP VECTOR. THEN LOAD LOCATION ''$RTRN'', IN
                                 ;;THE ''END-OF-PASS'' ($EOP) ROUTINE, WITH A ''RTI'' OR ''RTT''.
 020124  012737  034122  000014          MOV     #$RTRN,@#TBITVEC ;;SET ''T'' BIT VECTOR TO $RTRN
 020132  012737  000340  000016          MOV     #340,@#TBITVEC+2 ;;LEVEL 7
 020140  012737  000002  034122          MOV     #RTI,$RTRN      ;;SET $RTRN TO A RTI
 020146  012737  020174  000010          MOV     #65$,@#RESVEC   ;;TRY TO DO A RTT
 020154  005046                          CLR     -(SP)           ;;DUMMY PS
 020156  012746  020164                  MOV     #64$,-(SP)      ;;AND PC
 020162  000006                          RTT                     ;;TRY THE RTT
 020164  012737  000006  034122  64$:    MOV     #RTT,$RTRN      ;;RTT IS LEGAL--SET $RTRN TO A RTT
 020172  000402                          BR      66$
 020174  062706  000010          65$:    ADD     #10,SP          ;;RTT ILLEGAL--CLEAN OFF THE STACK
 020200  012737  000012  000010  66$:    MOV     #RESVEC+2,@#RESVEC ;;RESTORE TRAP CATCHER
 020206  005037  034130                  CLR     $TBIT           ;;CLEAR ''T'' BIT SWITCH
 020212  012737  020212  001106          MOV     #.,$LPADR       ;;INITIALIZE THE LOOP ADDRESS FOR SCOPE
 020220  012737  020220  001110          MOV     #.,$LPERR       ;;SETUP THE ERROR LOOP ADDRESS
                                 ;;SIZE FOR A HARDWARE SWITCH REGISTER. IF NOT FOUND OR IT IS
                                 ;;EQUAL TO A ''-1'', SETUP FOR A SOFTWARE SWITCH REGISTER.
 020226  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE ERROR VECTOR
 020232  012737  020266  000004          MOV     #67$,@#ERRVEC   ;;SET UP ERROR VECTOR
 020240  012737  177570  001140          MOV     #DSWR,SWR       ;;SETUP FOR A HARDWARE SWICH REGISTER
 020246  012737  177570  001142          MOV     #DDISP,DISPLAY  ;;AND A HARDWARE DISPLAY REGISTER
 020254  022777  177777  160656          CMP     #-1,@SWR        ;;TRY TO REFERENCE HARDWARE SWR
 020262  001012                          BNE     69$             ;;BRANCH IF NO TIMEOUT TRAP OCCURRED
                                                                 ;;AND  THE HARDWARE SWR IS NOT = -1
 020264  000403                          BR      68$             ;;BRANCH IF NO TIMEOUT
 020266  012716  020274          67$:    MOV     #68$,(SP)       ;;SET UP FOR TRAP RETURN
 020272  000002                          RTI
 020274  012737  000176  001140  68$:    MOV     #SWREG,SWR      ;;POINT TO SOFTWARE SWR
 020302  012737  000174  001142          MOV     #DISPREG,DISPLAY
```

```
    (2)  020310  012637  000004          69$:    MOV     (SP)+,@#ERRVEC  ;;RESTORE ERROR VECTOR
    (1)
    (2)  020314  005037  001234                  CLR     $PASS           ;;CLEAR PASS COUNT
    (2)  020320  132737  000200  001247        BITB    #APTSIZE,$ENVM  ;;TEST USER SIZE UNDER APT
    (2)  020326  001403                         BEQ     70$             ;;YES,USE NON-APT SWITCH
    (2)  020330  012737  001250  001140        MOV     #$SWREG,SWR     ;;NO,USE APT SWITCH REGISTER
    (2)  020336                          70$:
    627                                  ;; INITIALIZE THE ERROR COUNTER FOR EOP REPORT($ERTTL).
    628  020336  005037  001112                  CLR     $ERTTL          ;CLEAR ERROR COUNTER
    629                                  .SBTTL  TYPE PROGRAM NAME
    (1)                                  ;;TYPE THE NAME OF THE PROGRAM IF FIRST PASS
    (1)  020342  005227  177777                  INC     #-1             ;;FIRST TIME?
    (1)  020346  001046                         BNE     71$             ;;BRANCH IF NO
    (1)  020350  022737  034020  000042        CMP     #$ENDAD,@#42    ;;ACT-11?
    (1)  020356  001442                         BEQ     71$             ;;BRANCH IF YES
    (1)  020360  104401  020426                 TYPE    ,72$            ;;TYPE ASCIZ STRING
    (2)                                  .SBTTL  GET VALUE FOR SOFTWARE SWITCH REGISTER
    (2)  020364  005737  000042                  TST     @#42            ;;ARE WE RUNNING UNDER XXDP/ACT?
    (2)  020370  001012                         BNE     73$             ;;BRANCH IF YES
    (2)  020372  123727  001246  000001        CMPB    $ENV,#1         ;;ARE WE RUNNING UNDER APT?
    (2)  020400  001406                         BEQ     73$             ;;BRANCH IF YES
    (2)  020402  023727  001140  000176        CMP     SWR,#SWREG      ;;SOFTWARE SWITCH REG SELECTED?
    (2)  020410  001005                         BNE     74$             ;;BRANCH IF NO
    (2)  020412  104407                         GTSWR                   ;;GET SOFT-SWR SETTINGS
    (2)  020414  000403                         BR      74$
    (2)  020416  112737  000001  001134  73$:    MOVB    #1,$AUTOB       ;;SET AUTO-MODE INDICATOR
    (2)  020424                          74$:
    (1)  020424  000417                         BR      71$             ;;GET OVER THE ASCIZ
    (1)                                  ;;72$:  .ASCIZ  <CRLF>#CJKDAC0 KTF11-AA MMU DIAG.#<CRLF>
    (1)  020464                          71$:
    630
    631  020464                          RESTRT:
    632  020464  012706  001100          LOOP:   MOV     #STACK,KSP      ;INITIALIZE THE STACK POINTER
    633  020470  012737  002076  000004          MOV     #TIMERR,ERRVEC  ;LOAD CPU SERVICE ROUTINE INTO TRAP VECTOR
    634  020476  012737  000340  000006          MOV     #340,ERRVEC+2   ;SET NEW PS TO PRIORITY LEVEL 7-KERNEL
    635  020504  012737  002150  000250          MOV     #MGMERR,MMVEC   ;LOAD MEMORY MANAGENT ROUTINE INTO VECTOR
    636  020512  012737  000340  000252          MOV     #340,MMVEC+2    ;SET NEW PS TO PRIORITY LEVEL 7-KERNEL
    637  020520  012700  177777                  MOV     #-1,R0          ;PUT -1 INTO R0 TO INITIALIZE FLAGS
    638  020524  010037  002100                  MOV     R0,TIMFLG       ;INITIALIZE CPU ERROR FLAG
    639  020530  010037  002152                  MOV     R0,MGMFLG       ;INITIALIZE MEMORY MANAGEMENT ERROR FLAG
    640  020534  012737  000340  001276          MOV     #340,TBITPS     ;INITIALIZE LOG THAT HOLDS T-BIT PSW
    641  020542  005037  177572                  CLR     SR0             ;BE SURE MEM. MGMT IS OFF TO START WITH
    642
```

```
                        ;;*****************************************************************
                        ;*TEST 1        PSW PRIORITY BIT TEST
                        ;*
                        ;*      THIS TEST READS AND WRITES THE PROCESSOR STATUS WORD <7:5> 'PRIORITY BITS'
                        ;*      TO SEE THAT SOME OF THE BASIC 'DATA PATH' LOGIC IS WORKING.
                        ;*
                        ;;*****************************************************************
(2) 020546  000004      TST1:   SCOPE
653 020550  012737  020560  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
654 020556  005000              CLR     R0              ;INITIALIZE R0 WITH PRIORITY=0 DATA
655 020560  005001      2$:     CLR     R1              ;PREPARE R1 TO ACCEPT DATA READ
656 020562  106400              MTPS    R0              ;WRITE PRIORITY BITS IN THE PSW
657 020564  106701              MFPS    R1              ;READ BACK THE LOW BYTE OF PSW
658 020566  042701  177437          BIC     #177437,R1      ;MASK OFF EVERYTHING EXCEPT PRIORITY BITS
659 020572  020001              CMP     R0,R1           ;WAS CORRECT PRIORITY SET IN THE PSW?
660 020574  001401              BEQ     3$              ;BRANCH IF YES
661 020576  104003              ERROR   3               ;PRIORITY BITS SET WRONG IN PSW
662                                                     ;FOR TIGHTER SCOPE LOOP
663                                                     ;REPLACE ERROR CALL WITH
664                                                     ;'BR 2$' = 000770
665 020600  062700  000040      3$:     ADD     #40,R0          ;CHANGE DATA TO NEXT PRIORITY
666 020604  022700  000400          CMP     #400,R0         ;HAVE PRIORITIES 0-7 ALL BEEN CHECKED?
667 020610  001363              BNE     2$              ;BRANCH IF NO
668 020612  012737  020550  001110      MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
669
674                         ;;*****************************************************************
(3)                         ;*TEST 2        PSW MODE BIT TEST
(4)                         ;*      THIS TEST READS AND WRITES THE PROCESSOR STATUS WORD <15:12> 'MODE BITS'
(4)                         ;*
(3)                         ;;*****************************************************************
(2) 020620  000004      TST2:   SCOPE
675 020622  012737  020632  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
676 020630  005000              CLR     R0              ;INITIALIZE R0 WITH MODE BITS = 0000
677 020632  005037  177776      2$:     CLR     PSW             ;INITIALIZE PSW
678 020636  050037  177776          BIS     R0,PSW          ;BIT SET THE PSW MODE BITS WITH R0
679 020642  013701  177776          MOV     PSW,R1          ;READ BACK THE CONTENTS OF THE PSW
680 020646  042701  007777          BIC     #007777,R1      ;MASK OFF EVERYTHING EXCEPT THE MODE BITS
681 020652  020001              CMP     R0,R1           ;WERE THE MODE BITS SET CORRECTLY?
682 020654  001403              BEQ     3$              ;BRANCH IF YES
683 020656  005037  177776          CLR     PSW             ;CLEAR PSW FOR ERROR REPORT
684 020662  104004              ERROR   4               ;MODE BITS SET WRONG IN PSW
685                                                     ;FOR TIGHTER SCOPE LOOP
686                                                     ;REPLACE ERROR CALL WITH
687                                                     ;'BR 2$' = 000763
688 020664  062700  010000      3$:     ADD     #10000,R0       ;CHANGE MODE BIT DATA
689 020670  001360              BNE     2$              ;BRANCH IF STILL MORE COMBINATIONS
690 020672  012737  020622  001110      MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
691 020700  005037  177776          CLR     PSW             ;RESET PSW BEFORE LEAVING
692
699                         ;;*****************************************************************
(3)                         ;*TEST 3        BYTE ADDRESSING TEST FOR PSW
(4)                         ;*
(4)                         ;*      THIS TEST WRITES THE HIGH AND LOW BYTES OF THE PROCESSOR STATUS WORD
(4)                         ;*      AND READS THEM BACK TO BE SURE THEY CAN BE WRITTEN INDEPENDENTLY.
```

```
(4)                                     ;*
(3)                                     ;**************************************************************
(2)  020704  000004                     TST3:   SCOPE
700  020706  012737  020714  001110     1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
701  020714  005037  177776             2$:     CLR     PSW             ;CLEAR THE PSW
702  020720  012700  000360                     MOV     #360,R0         ;PUT THE HIGH BYTE DATA INTO R0
703  020724  110037  177777                     MOVB    R0,PSW+1        ;WRITE THE HIGH BYTE OF THE PSW
704  020730  013701  177776                     MOV     PSW,R1          ;READ BACK THE ENTIRE PSW
705  020734  042701  007437                     BIC     #007437,R1      ;MASK OFF THE T & CC BITS
706  020740  000300                             SWAB    R0              ;GET DATA WRITTEN IN HIGH BYTE OF R0
707  020742  020001                             CMP     R0,R1           ;WAS THE PSW WRITTEN TO CORRECTLY
708  020744  001403                             BEQ     3$              ;BRANCH IF YES
709  020746  005037  177776                     CLR     PSW             ;CLEAR PSW FOR ERROR REPORT
710  020752  104005                             ERROR   5               ;LOW BYTE EFFECTED BY WRITE TO HIGH BYTE OF PSW
711                                                                     ;FOR TIGHTER SCOPE LOOP
712                                                                     ;REPLACE ERROR CALL WITH
713                                                                     ;'BR 2$'' = 000760
714  020754  012737  020762  001110     3$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
715  020762  005037  177776             4$:     CLR     PSW             ;CLEAR THE PSW
716  020766  012700  000340                     MOV     #340,R0         ;PUT THE LOW BYTE DATA INTO R0
717  020772  110037  177776                     MOVB    R0,PSW          ;WRITE THE LOW BYTE OF THE PSW
718  020776  013701  177776                     MOV     PSW,R1          ;READ BACK THE ENTIRE PSW
719  021002  042701  007437                     BIC     #007437,R1      ;MASK OFF THE T&CC BITS
720  021006  020001                             CMP     R0,R1           ;WAS PSW WRITTEN TO CORRECTLY
721  021010  001403                             BEQ     5$              ;BRANCH IF YES
722  021012  005037  177776                     CLR     PSW             ;CLEAR PSW FOR ERROR REPORT
723  021016  104005                             ERROR   5               ;HIGH BYTE EFFECTED BY WRITE TO LOW BYTE OF PSW
724                                                                     ;FOR TIGHTER SCOPE LOOP
725                                                                     ;REPLACE ERROR CALL WITH
726                                                                     ;'BR 2$'' = 000736
727  021020  012737  020706  001110     5$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
728
737                                     ;**************************************************************
(3)                                     ;TEST 4         TEST AND SETUP OF STACK POINTERS
(4)                                     ;*
(4)                                     ;*      THIS TEST SETS THE USER AND KERNEL STACK POINTERS FOR THE
(4)                                     ;*      REST OF THE PROGRAM AND MAKES SURE THEY ARE INDEPENDENT OF
(4)                                     ;*      EACH OTHER.  KERNEL R6 IS SET TO 1100, USER R6 IS SET TO 700, THEN
(4)                                     ;*      KERNEL R6 IS READ TO BE SURE ITS STILL 1100.
(4)                                     ;*
(3)                                     ;**************************************************************
(2)  021026  000004                     TST4:   SCOPE
738  021030  005037  !77776                    CLR     PSW             ;GO TO KERNEL MODE
739  021034  012706  001100                     MOV     #KERSTK,KSP     ;SET KERNEL STACK POINTER TO 1100
740  021040  012737  140000  177776             MOV     #140000,PSW     ;GO TO USER MODE
741  021046  012706  000700                     MOV     #USESTK,USP     ;SET USER STACK POINTER TO 700
742  021052  005037  177776                     CLR     PSW             ;BACK TO KERNEL MODE
743  021056  022706  001100                     CMP     #KERSTK,KSP     ;IS KERNEL R6 STILL 1100?
744  021062  001404                             BEQ     TST5            ;;BRANCH IF KERNEL R6 IS OKAY
745  021064  012700  001100                     MOV     #KERSTK,R0      ;SAVE DATA WRITTEN FOR ERROR REPORT
746  021070  010601                             MOV     KSP,R1          ;SAVE DATA READ AFTER USER R6 WAS WRITTEN
747  021072  104006                             ERROR   6               ;KERNEL R6 CHANGED BY WRITING USER R6
748                                                                     ;FOR TIGHTER SCOPE LOOP
749                                                                     ;REPLACE ERROR CALL WITH
750                                                                     ;000756
751
```

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


                        ;;*****************************************************************
                        ;*TEST 5        SR0,SR1,SR2,SR3 TIMEOUT TEST
                        ;*
                        ;*      THIS TEST ADDRESSES THE MEMORY MANAGEMENT STATUS REGISTERS
                        ;*      0,1,2, AND 3.  STATUS REG. 1 IS NOT USED BUT SHOULD STILL
                        ;*      RESPOND TO ITS UNIBUS ADDRESS.  DATA WILL BE WRITTEN OR READ
                        ;*      FROM THESE REGISTERS IN LATER TESTS, THIS TEST JUST CHECK
                        ;*      FOR A RESPONSE.
                        ;*
                        ;;*****************************************************************
021074  000004         TST5:   SCOPE

021076  012737  021140  001110  1$:    MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
021104  012737  021202  000004        MOV     #5$,@#4         ;SET TIMEOUT VECTOR TO 5$
021112  012700  177572                MOV     #SR0,R0         ;LOAD R0 WITH ADDRESS OF FIRST REG.
021116  012701  000003                MOV     #3,R1           ;LOAD R1 WITH THE LOOP COUNT
021122  012737  177777  001300        MOV     #-1,ANDADR      ;INITIALIZE ''AND'' OF ADDRS. LOC.
021130  005037  001302                CLR     ORADR           ;INITIALIZE ''OR'' OF ADDRS. LOC.
021134  005037  001304                CLR     TONUM           ;INITIALIZE ''TIMEOUTS'' COUNTER
021140  005710                 2$:    TST     (R0)            ;TRY ADDRESSING A STATUS REGISTER
                                                               ;IF IT TIMES OUT GO TO 5$
021142  062700  000002         3$:    ADD     #2,R0           ;PUT NEXT ADDRESS IN R0
021146  077104                        SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
021150  005737  172516                TST     @#172516        ;CHECK SR3 FOR RESPONSE
                                                               ;IF IT TIMES OUT GO TO 5$
021154  012737  021076  001110        MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
021162  005737  001304                TST     TONUM           ;DID ANY OF THE STATUS REG.S TIMEOUT?
021166  001401                        BEQ     4$              ;BRANCH IF NO
021170  104010                        ERROR   10              ;SUMMARY OF STATUS REG. TIMEOUTS
021172  012737  002076  000004  4$:    MOV     #TIMERR,@#4     ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
021200  000[illegible]4                BR      TST6            ;;GO TO NEXT TEST

021202  062706  000004         5$:    ADD     #4,KSP          ;CLEAN UP THE STACK
021206  104007                        ERROR   7               ;ONE OF THE STATUS REGS. TIMED OUT
                                                               ;FOR TIGHTER SCOPE LOOP
                                                               ;REPLACE ERROR CALL WITH
                                                               ;''BR 2$'' = 000756
021210  010002                        MOV     R0,R2           ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
021212  050237  001302                BIS     R2,ORADR        ;''OR'' IT WITH OTHER ADDRS. THAT TIMED OUT
021216  005102                        COM     R2              ;''AND'' IT WITH OTHER ADDRS. THAT TIMED OUT
021220  040237  001300                BIC     R2,ANDADR
021224  005237  001304                INC     TONUM           ;INCREMENT THE TIMEOUT COUNTER
```

```
807  021230  000744                          BR      3$              ;BRANCH BACK TO TEST THE NEXT ADDR.
808
812                                  ;;*****************************************************************
(3)                                  ;*TEST 6        KERNEL PAR'S TIMEOUT TEST
(5)                                  ;*
(5)                                  ;*      THIS TEST ADDRESSES THE EIGHT (8) KERNEL PAGE ADDRESS
(5)                                  ;*      REGISTERS (KIPAR0-KIPAR7) AND CHECKS THAT SOMETHING
(5)                                  ;*      RESPONDS TO THEIR ADDRESSES.
(5)                                  ;*
(3)                                  ;;*****************************************************************
(2)  021232  000004                  TST6:   SCOPE
813
(1)  021234  012737  (21276  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
(1)  021242  012737  021334  000004          MOV     #5$,@#4         ;SET TIMEOUT VECTOR TO 5$
(1)  021250  012700  '2340                   MOV     #KIPAR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
(1)  021254  012701  (00010                  MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
(1)  021260  012737  177777  001300          MOV     #-1,ANDADR      ;INITIALIZE ''AND'' OF ADDR. LOC
(1)  021266  005037  001302                  CLR     ORADR           ;INITIALIZE ''OR'' OF ADDR. LOC.
(1)  021272  005037  001304                  CLR     TONUM           ;INITIALIZE ''TIMEOUTS'' COUNTER
(1)  021276  005710                  2$:     TST     (R0)            ;TRY ADDRESSING A KIPAR
(1)                                                                  ;IF IT TIMES OUT, WILL GO TO 5$
(1)  021300  062700  000002          3$:     ADD     #2,R0           ;PUT NEXT KIPAR ADDRESS IN R0
(1)  021304  077104                          SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
(1)  021306  012737  021234  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
(1)  021314  005737  001304                  TST     TONUM           ;DID ANY OF THE KIPARS TIME OUT?
(1)  021320  001401                          BEQ     4$              ;BRANCH IF NO
(1)  021322  104010                          ERROR   10              ;SUMMARY OF KIPAR TIMEOUTS
(1)  021324  012737  002076  000004  4$:     MOV     #TIMERR,@#4     ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
(3)  021332  000414                          BR      TST7            ;;GO TO NEXT TEST
(1)
(1)  021334  062706  000004          5$:     ADD     #4,KSP          ;CLEAN UP THE STACK
(1)  021340  104007                          ERROR   7               ;ONE OF THE KIPARS TIMED OUT
(1)                                                                  ;FOR TIGHTER SCOPE LOOP
(1)                                                                  ;REPLACE ERROR CALL WITH
(1)                                                                  ;''BR 2$'' = 000756
(1)  021342  010002                          MOV     R0,R2           ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
(1)  021344  050237  001302                  BIS     R2,ORADR        ;''OR'' IT WITH OTHER ADDRS. THAT TIMED OUT
(1)  021350  005102                          COM     R2              ;''AND'' IT WITH OTHER ADDRS. THAT TIMED OUT
(1)  021352  040237  001300                  BIC     R2,ANDADR
(1)  021356  005237  001304                  INC     TONUM           ;INCREMENT THE TIMEOUT COUNTER
(1)  021362  000746                          BR      3$              ;BRANCH BACK TO TEST THE NEXT KIPAR
814
818                                  ;;*****************************************************************
(3)                                  ;*TEST 7        KERNEL PDR'S TIMEOUT TEST
(5)                                  ;*
(5)                                  ;*      THIS TEST ADDRESSES THE EIGHT (8) KERNEL PAGE DESCRIPTOR
(5)                                  ;*      REGISTERS (KIPDR0-KIPDR7) AND CHECKS THAT SOMETHING
(5)                                  ;*      RESPONDS TO THEIR ADDRESSES.
(5)                                  ;*
(3)                                  ;;*****************************************************************
(2)  021364  000004                  TST7:   SCOPE
819
(1)  021366  012737  021430  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
(1)  021374  012737  021466  000004          MOV     #5$,@#4         ;SET TIMEOUT VECTOR TO 5$
(1)  021402  012700  172300                  MOV     #KIPDR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
(1)  021406  012701  000010                  MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
```

```
(1)  021412  012737  177777  001300          MOV     #-1,ANDADR      ;INITIALIZE ''AND'' OF ADDR. LOC
(1)  021420  005037  001302                  CLR     ORADR           ;INITIALIZE ''OR'' OF ADDR. LOC.
(1)  021424  005037  001304                  CLR     TONUM           ;INITIALIZE ''TIMEOUTS'' COUNTER
(1)  021430  005710                  2$:     TST     (R0)            ;TRY ADDRESSING A KIPDR
(1)                                                                  ;IF IT TIMES OUT, WILL GO TO 5$
(1)  021432  062700  000002          3$:     ADD     #2,R0           ;PUT NEXT KIPDR ADDRESS IN R0
(1)  021436  077104                          SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
(1)  021440  012737  021366  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
(1)  021446  005737  001304                  TST     TONUM           ;DID ANY OF THE KIPDRS TIME OUT?
(1)  021452  001401                          BEQ     4$              ;BRANCH IF NO
(1)  021454  104010                          ERROR   10              ;SUMMARY OF KIPDR TIMEOUTS
(1)  021456  012737  002076  000004  4$:     MOV     #TIMERR,@#4     ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
(3)  021464  000414                          BR      TST10           ;;GO TO NEXT TEST
(1)
(1)  021466  062706  000004          5$:     ADD     #4,KSP          ;CLEAN UP THE STACK
(1)  021472  104007                          ERROR   7               ;ONE OF THE KIPDRS TIMED OUT
(1)                                                                  ;FOR TIGHTER SCOPE LOOP
(1)                                                                  ;REPLACE ERROR CALL WITH
(1)                                                                  ;''BR 2$'' = 000756
(1)  021474  010002                          MOV     R0,R2           ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
(1)  021476  050237  001302                  BIS     R2,ORADR        ;''OR'' IT WITH OTHER ADDRS. THAT TIMED OUT
(1)  021502  005102                          COM     R2              ;''AND'' IT WITH OTHER ADDRS. THAT TIMED OUT
(1)  021504  040237  001300                  BIC     R2,ANDADR
(1)  021510  005237  001304                  INC     TONUM           ;INCREMENT THE TIMEOUT COUNTER
(1)  021514  000746                          BR      3$              ;BRANCH BACK TO TEST THE NEXT KIPDR
 820
 824                                 ;;*****************************************************************
(3)                                  ;*TEST 10       USER PAR'S TIMEOUT TEST
(5)                                  ;*
(5)                                  ;*      THIS TEST ADDRESSES THE EIGHT (8) USER PAGE ADDRESS
(5)                                  ;*      REGISTERS (UIPAR0-UIPAR7) AND CHECKS THAT SOMETHING
(5)                                  ;*      RESPONDS TO THEIR ADDRESSES.
(5)                                  ;*
(3)                                  ;;*****************************************************************
(2)  021516  000004                  TST10:  SCOPE
 825
(1)  021520  012737  021562  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
(1)  021526  012737  021620  000004          MOV     #5$,@#4         ;SET TIMEOUT VECTOR TO 5$
(1)  021534  012700  177640                  MOV     #UIPAR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
(1)  021540  012701  000010                  MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
(1)  021544  012737  177777  001300          MOV     #-1,ANDADR      ;INITIALIZE ''AND'' OF ADDR. LOC
(1)  021552  005037  001302                  CLR     ORADR           ;INITIALIZE ''OR'' OF ADDR. LOC.
(1)  021556  005037  001304                  CLR     TONUM           ;INITIALIZE ''TIMEOUTS'' COUNTER
(1)  021562  005710                  2$:     TST     (R0)            ;TRY ADDRESSING A UIPAR
(1)                                                                  ;IF IT TIMES OUT, WILL GO TO 5$
(1)  021564  062700  000002          3$:     ADD     #2,R0           ;PUT NEXT UIPAR ADDRESS IN R0
(1)  021570  077104                          SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
(1)  021572  012737  021520  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
(1)  021600  005737  001304                  TST     TONUM           ;DID ANY OF THE UIPARS TIME OUT?
(1)  021604  001401                          BEQ     4$              ;BRANCH IF NO
(1)  021606  104010                          ERROR   10              ;SUMMARY OF UIPAR TIMEOUTS
(1)  021610  012737  002076  000004  4$:     MOV     #TIMERR,@#4     ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
(3)  021616  000414                          BR      TST11           ;;GO TO NEXT TEST
(1)
(1)  021620  062706  000004          5$:     ADD     #4,KSP          ;CLEAN UP THE STACK
(1)  021624  104007                          ERROR   7               ;ONE OF THE UIPARS TIMED OUT
```

```
(1)                                                     ;FOR TIGHTER SCOPE LOOP
(1)                                                     ;REPLACE ERROR CALL WITH
(1)                                                     ;'BR 2$' = 000756
(1)  021626  010002                     MOV     R0,R2   ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
(1)  021630  050237  001302             BIS     R2,ORADR        ;'OR' IT WITH OTHER ADDRS. THAT TIMED OUT
(1)  021634  005102                     COM     R2      ;'AND' IT WITH OTHER ADDRS. THAT TIMED OUT
(1)  021636  040237  001300             BIC     R2,ANDADR
(1)  021642  005237  001304             INC     TONUM   ;INCREMENT THE TIMEOUT COUNTER
(1)  021646  000746                     BR      3$      ;BRANCH BACK TO TEST THE NEXT UIPAR
826
830                             ;;*****************************************************************
(3)                             ;*TEST 11       USER PDR'S TIMEOUT TEST
(5)                             ;*
(5)                             ;*      THIS TEST ADDRESSES THE EIGHT (8) USER PAGE DESCRIPTOR
(5)                             ;*      REGISTERS (UIPDR0-UIPDR7) AND CHECKS THAT SOMETHING
(5)                             ;*      RESPONDS TO THEIR ADDRESSES.
(5)                             ;*
(3)                             ;;*****************************************************************
(2)  021650  000004             TST11:  SCOPE
831
(1)  021652  012737  021714  001110  1$:  MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
(1)  021660  012737  021752  000004     MOV     #5$,@#4         ;SET TIMEOUT VECTOR TO 5$
(1)  021666  012700  177600             MOV     #UIPDR0,R0      ;LOAD R0 WITH ADDRESS OF FIRST REG.
(1)  021672  012701  000010             MOV     #10,R1          ;LOAD R1 WITH LOOP COUNT (8)
(1)  021676  012737  177777  001300     MOV     #-1,ANDADR      ;INITIALIZE ''AND'' OF ADDR. LOC
(1)  021704  005037  001302             CLR     ORADR           ;INITIALIZE 'OR'' OF ADDR. LOC.
(1)  021710  005037  001304             CLR     TONUM           ;INITIALIZE ''TIMEOUTS'' COUNTER
(1)  021714  005710                 2$: TST     (R0)            ;TRY ADDRESSING A UIPDR
(1)                                                     ;IF IT TIMES OUT, WILL GO TO 5$
(1)  021716  062700  000002         3$: ADD     #2,R0           ;PUT NEXT UIPDR ADDRESS IN R0
(1)  021722  077104                     SOB     R1,2$           ;LOOP BACK TO 2$ UNTIL ALL TESTED
(1)  021724  012737  021652  001110     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
(1)  021732  005737  001304             TST     TONUM           ;DID ANY OF THE UIPDRS TIME OUT?
(1)  021736  001401                     BEQ     4$              ;BRANCH IF NO
(1)  021740  104010                     ERROR   10              ;SUMMARY OF UIPDR TIMEOUTS
(1)  021742  012737  002076  000004  4$: MOV     #TIMERR,@#4     ;RESTORE NORMAL CPU TRAP ROUTINE ADDRESS
(3)  021750  000414                     BR      TST12           ;;GO TO NEXT TEST
(1)
(1)  021752  062706  000004         5$: ADD     #4,KSP          ;CLEAN UP THE STACK
(1)  021756  104007                     ERROR   7               ;ONE OF THE UIPDRS TIMED OUT
(1)                                                     ;FOR TIGHTER SCOPE LOOP
(1)                                                     ;REPLACE ERROR CALL WITH
(1)                                                     ;'BR 2$' = 000756
(1)  021760  010002                     MOV     R0,R2   ;LOAD THE ADDRESS THAT TIMED OUT INTO R2
(1)  021762  050237  001302             BIS     R2,ORADR        ;'OR' IT WITH OTHER ADDRS. THAT TIMED OUT
(1)  021766  005102                     COM     R2      ;'AND' IT WITH OTHER ADDRS. THAT TIMED OUT
(1)  021770  040237  001300             BIC     R2,ANDADR
(1)  021774  005237  001304             INC     TONUM   ;INCREMENT THE TIMEOUT COUNTER
(1)  022000  000746                     BR      3$      ;BRANCH BACK TO TEST THE NEXT UIPDR
832
843                             ;;*****************************************************************
(3)                             ;*TEST 12       SR0(15:13) BIT TEST & SR2 TEST
(4)                             ;*
(4)                             ;*      THIS TEST CHECKS BITS <15:13> OF STATUS REGISTER 0 TO SEE
(4)                             ;*      THAT EACH CAN BE SET AND CLEARED AND THAT A ''RESET'' WILL
(4)                             ;*      CLEAR ALL OF THEM.
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(4)                                     ;*      THE REST OF BITS IN SR0 WILL BE CHECKED LATER.
(4)                                     ;*      ALSO CHECK THAT SR2 IS TRACKING WITH MEM. MGMT.
(4)                                     ;*      OFF BUT LOCKS UP WHEN ANY OF SR0 ERROR BITS SET.
(4)                                     ;*
(3)                                     ;;*****************************************************************
(2)  022002  000004                     TST12:  SCOPE
844
845  022004  012700  177572             1$:     MOV     #SR0,R0         ;LOAD ADDRESS OF SR0 INTO R0
846  022010  012710  160000                     MOV     #160000,(R0)    ;SET BITS <15:13> IN SR0 (ERROR BITS)
847  022014  000005                             RESET                   ;ISSUE AND ''INIT'' SIGNAL
848  022016  011001                             MOV     (R0),R1         ;READ SR0 INTO R1 TO SEE IF CLEAR
849  022020  001404                             BEQ     2$              ;BRANCH IF SR0<15:13> CLEARED BY ''INIT''
850  022022  104011                             ERROR   11              ;SR0<15:13> NOT CLEARED BY A 'RESET''
851                                                                     ;FOR TIGHTER SCOPE LOOP
852                                                                     ;REPLACE ERROR CALL WITH
853                                                                     ;'BR 1$'' = 000770
854  022024  012737  022032  001110             MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
855  022032  013737  177576  001274     2$:     MOV     SR2,WASSR2      ;READ CONTENTS OF SR2
856  022040  012701  022032                     MOV     #2$,R1          ;LOAD EXPECTED CONTENTS INTO R1
857  022044  020137  001274                     CMP     R1,WASSR2       ;IS SR2 TRACKING?
858  022050  001401                             BEQ     3$              ;BRANCH IF YES
859  022052  104041                             ERROR   41              ;SR2 NOT 'TRACKING'' VIRTUAL ADDRESSES
860                                                                     ;FOR TIGHTER SCOPE LOOP
861                                                                     ;REPLACE ERROR CALL WITH
862                                                                     ;'BR 2$'' = 000767
863  022054  012737  022072  001110     3$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
864  022062  012701  100000                     MOV     #BIT15,R1       ;PUT DATA TO BE WRITTEN IN R1
865  022066  012703  000003                     MOV     #3,R3           ;SETUP R3 AS A LOOP COUNTER
866  022072  005010                     4$:     CLR     (R0)            ;CLEAR SR0
867  022074  050110                     5$:     BIS     R1,(R0)         ;SET ONE OF THE ERROR BITS IN SR0
868  022076  011002                             MOV     (R0),R2         ;READ SR0 INTO R2
869  022100  020102                             CMP     R1,R2           ;DID RIGHT ERROR BIT GET SET?
870  022102  001401                             BEQ     6$              ;BRANCH IF YES
871  022104  104012                             ERROR   12              ;BITS WERE SET WRONG IN SR0
872                                                                     ;FOR TIGHTER SCOPE LOOP
873                                                                     ;REPLACE ERROR CALL WITH
874                                                                     ;'BR 4$'' = 000772
875  022106  012704  022074             6$:     MOV     #5$,R4          ;LOAD EXPECTED CONTENTS OF SR2 IN R4
876  022112  013737  177576  001274             MOV     SR2,WASSR2      ;READ SR2
877  022120  020437  001274                     CMP     R4,WASSR2       ;DID SR2 LOCK UP WHEN ERROR
878                                                                     ;BIT SET IN SR1?
879  022124  001401                             BEQ     7$              ;BRANCH IF YES
880  022126  104064                             ERROR   64              ;SR2 DID NOT LOCK UP
881                                                                     ;FOR TIGHTER SCOPE LOOP
882                                                                     ;REPLACE ERROR CALL WITH
883                                                                     ;'BR 4$'' = 000761
884  022130  006001                     7$:     ROR     R1              ;CHANGE DATA TO CHECK NEXT ERROR BIT
885  022132  077321                             SOB     R3,4$           ;LOOP BACK UNTIL <15:13> ALL TESTED
886  022134  005010                             CLR     (R0)            ;CLEAR SR0 BEFORE LEAVING
887  022136  012737  022004  001110             MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
888
898                                     ;;*****************************************************************
(3)                                     ;*TEST 13       SR0 & PSW DUAL ADDRESSING TEST
(4)                                     ;*
(4)                                     ;*      THIS TEST CHECKS MORE OF THE ADDRESS DETECTION LOGIC BY
(4)                                     ;*      VERIFYING THAT STATUS REGISTER 0 IS NOT EFFECTED BY WRITING
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(4)                                     ;*      TO THE PSW AND THAT THE LOW BYTE OF STATUS REGISTER 0
(4)                                     ;*      IS NOT EFFECTED BY WRITING TO ITS HIGH BYTE.  THIS IS TO
(4)                                     ;*      SEE IF ADJACENT OUTPUTS ARE SHORTED ON THE ADDRESS DET. LOGIC.
(4)                                     ;*
(3)                                     ;;*****************************************************************
(2)  022144  000004                     TST13:  SCOPE
899
900  022146  005037  177776             1$:     CLR     PSW             ;CLEAR THE PSW
901  022152  005037  177572                     CLR     SR0             ;CLEAR STATUS REGISTER 0
902  022156  106427  000340                     MTPS    #340            ;SET PRIORITY 7 IN LOW BYTE OF PSW
903  022162  013700  177572                     MOV     SR0,R0          ;READ STATUS REGISTER 0
904  022166  001401                             BEQ     2$              ;BRANCH IF IT WAS STILL 0
905  022170  104013                             ERROR   13              ;SR0 EFFECTED BY A WRITE TO THE PSW
906                                                                     ;FOR TIGHTER SCOPE LOOP
907                                                                     ;REPLACE ERROR CALL WITH
908                                                                     ;'BR 1$'' = 000767
909  022172  005037  177572             2$:     CLR     SR0             ;BE SURE SR0 IS 0 BEFORE LEAVING
910  022176  005037  177776                     CLR     PSW             ;BE SURE PSW IS 0 BEFORE LEAVING
911
919                                     ;;*****************************************************************
(3)                                     ;*TEST 14       TEST THAT SR1 READS ALL ZEROS
(4)                                     ;*
(4)                                     ;*      THIS TESTS CHECKS THAT STATUS REGISTER 1
(4)                                     ;*      RESPONDS WITH ALL ZEROS, AND THAT ONLY BITS<5:4>
(4)                                     ;*      OF STATUS REGISTER 3 ARE WRITEABLE.
(4)                                     ;*
(3)                                     ;;*****************************************************************
(2)  022202  000004                     TST14:  SCOPE
920  022204  012700  177777             1$:     MOV     #-1,R0          ;FILL R0 WITH ALL ONES
921  022210  013700  177574                     MOV     SR1,R0          ;READ SR1 INTO R0
922  022214  001401                             BEQ     2$              ;BRANCH IF SR1 READS ALL ZEROS
923  022216  104014                             ERROR   14              ;SR1 DID NOT READ ALL ZEROS
924                                                                     ;FOR TIGHTER SCOPE LOOP
925                                                                     ;REPLACE ERROR CALL WITH
926                                                                     ;000772
927  022220  012737  177777  172516     2$:     MOV     #-1,SR3         ;TRY TO WRITE ONES TO SR3
928  022226  022737  000060  172516             CMP     #60,SR3         ;ONLY BITS <5:4> SHOULD BE ONES
929  022234  001401                             BEQ     3$
930  022236  104012                             ERROR   12              ;DIDN'T READ BACK A ''60''
931  022240  000005                     3$:     RESET                   ;CLEARS SR3
932  022242  005737  172516                     TST     SR3             ;VERIFY THAT IT WAS CLEARED
933  022246                             4$:
(2)  022246  001401                             BEQ     TST15           ;;BRANCH IF SR3 READ ALL ZEROS
934  022250  104012                             ERROR   12              ;SR3 DIDN'T READ ALL ZEROS
935
943
944
945                                     ;;*****************************************************************
(3)                                     ;*TEST 15       BIT TEST OF KERNEL & USER PAR'S
(4)                                     ;*
(4)                                     ;*      THE FOLLOWING TEST CHECKS THE BITS <15:00> OF BOTH THE KERNEL
(4)                                     ;*      AND USER PAGE ADDRESS REGISTERS.  A '0'' IS ROTATED THRU
(4)                                     ;*      THE REGISTERS FROM LEFT TO RIGHT.
(4)                                     ;*
(3)                                     ;;*****************************************************************
(2)  022252  000004                     TST15:  SCOPE
```

```

022254  012700  172340          1$:    MOV     #KIPAR0,R0        ;LOAD ADDRESS OF FIRST PAR IN R0
022260  012703  000010          2$:    MOV     #10,R3            ;SETUP R3 TO COUNT 8 PAR'S
022264  012737  022272  001110         MOV     #3$,$LPERR        ;SET LOOP ON ERROR POINTER TO 3$
022272  005010                  3$:    CLR     (R0)              ;CLEAR THE PAR
022274  011001                         MOV     (R0),R1           ;READ THE PAR INTO R1
022276  001401                         BEQ     4$                ;BRANCH IF PAR CLEARED OK
022300  104011                         ERROR   11                ;PAR WOULD NOT CLEAR
                                                                 ;FOR TIGHTER SCOPE LOOP
                                                                 ;REPLACE ERROR CALL WITH
                                                                 ;'BR 3$'' = 000774
022302  012704  077777          4$:    MOV     #077777,R4        ;LOAD 'WALKING 0'' TEST PATTERN IN R4
022306  012737  022314  001110         MOV     #5$,$LPERR        ;SET LOOP ON ERROR POINTER TO 5$
022314  005010                  5$:    CLR     (R0)              ;CLEAR THE PAR BEFORE LOADING DATA
022316  050410                         BIS     R4,(R0)           ;BIT SET THE TEST PATTERN INTO THE PAR
022320  011002                         MOV     (R0),R2           ;READ THE PAR INTO R2
022322  020402                         CMP     R4,R2             ;DOES DATA WRITTEN=DATA READ?
022324  001402                         BEQ     6$                ;BRANCH IF YES
022326  010401                         MOV     R4,R1             ;SETUP FOR ERROR REPORTING
022330  104012                         ERROR   12                ;PAR BITS DID NOT SET CORRECTLY
                                                                 ;FOR TIGHTER SCOPE LOOP
                                                                 ;REPLACE ERROR CALL WITH
                                                                 ;'BR 5$'' = 000767
022332  000261                  6$:    SEC                       ;SET THE C-BIT FOR THE ROTATE INST.
022334  006004                         ROR     R4                ;ROTATE THE TEST PATTERN IN R4
022336  103766                         BCS     5$                ;BRANCH BACK IF MORE BITS TO TEST
022340  062700  000002                 ADD     #2,R0             ;GET NEXT PAR ADDRESS IN R0
022344  077326                         SOB     R3,3$             ;BRANCH BACK UNTIL ALL PAR'S TESTED
022346  022700  177660                 CMP     #UIPAR7+2,R0      ;HAVE USER PAR'S BEEN TESTED
022352  103003                         BHIS    7$                ;BRANCH IF YES
022354  012700  177640                 MOV     #UIPAR0,R0        ;LOAD FIRST USER PAR ADDR. IN R0
022360  000737                         BR      2$                ;BRANCH BACK TO TEST USER PAR'S
022362  012737  022254  001110  7$:    MOV     #1$,$LPERR        ;RESET LOOP OR ERROR POINTER TO 1$
                                                                 ;LEAVE TEST WITH BITS <11:1>=1 IN ALL PAR'S
                                ;;****************************************************************
                                ;*TEST 16        BIT TEST OF KERNEL & USER PDR'S
                                ;*
                                ;*      THE FOLLOWING TEST CHECKS THE BITS <14:8> AND <3:1> OF BOTH THE
                                ;*      KERNEL AND USER PAGE DESCRIPTOR REGISTERS.  A '0'' IS ROTATED
                                ;*      THRU THE REGISTERS FROM LEFT TO RIGHT.  SOME TEST PATTERNS WILL
                                ;*      BE LOADED MORE THAN ONCE DUE TO THE UNUSED BITS IN THE PDR'S.
                                ;*
                                ;;****************************************************************
022370  000004                  TST16: SCOPE

022372  012700  172300          1$:    MOV     #KIPDR0,R0        ;LOAD ADDRESS OF FIRST PDR IN R0
022376  012703  000010          2$:    MOV     #10,R3            ;SETUP R3 TO COUNT 8 PDR'S
022402  012737  022410  001110         MOV     #3$,$LPERR        ;SET LOOP ON ERROR POINTER TO 3$
022410  005010                  3$:    CLR     (R0)              ;CLEAR THE PDR
022412  011001                         MOV     (R0),R1           ;READ THE PDR INTO R1
022414  001401                         BEQ     4$                ;BRANCH IF PDR CLEARED OK
022416  104011                         ERROR   11                ;PDR WOULD NOT CLEAR
                                                                 ;FOR TIGHTER SCOPE LOOP
                                                                 ;REPLACE ERROR CALL WITH
                                                                 ;'BR 3$'' = 000774
022420  012704  077777          4$:    MOV     #077777,R4        ;LOAD 'WALKING '0'' TEST PATTERN IN R4
```

```
 1001  022424  012737  022432  001110          MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
 1002  022432  005010                  5$:     CLR     (R0)            ;CLEAR THE PDR BEFORE LOADING DATA
 1003  022434  010401                          MOV     R4,R1           ;LOAD DATA INTO R1
 1004  022436  042701  100361                  BIC     #100361,R1      ;MASK UNUSED BITS OUT OF THE DATA
 1005  022442  050110                          BIS     R1,(R0)         ;BIT SET THE TEST PATTERN INTO THE PDR
 1006  022444  011002                          MOV     (R0),R2         ;READ THE PDR INTO R2
 1007  022446  020102                          CMP     R1,R2           ;DOES DATA WRITTEN=DATA READ?
 1008  022450  001401                          BEQ     6$              ;BRANCH IF YES
 1009  022452  104012                          ERROR   12              ;PDR BITS DID NOT SET CORRECTLY
 1010                                                                  ;FOR TIGHTER SCOPE LOOP
 1011                                                                  ;REPLACE ERROR CALL WITH
 1012                                                                  ;'BR 5$'' = 000767
 1013  022454  000261                  6$:     SEC                     ;SET THE C-BIT FOR THE ROTATE INST.
 1014  022456  006004                          ROR     R4              ;ROTATE THE TEST PATTERN IN R4
 1015  022460  103764                          BCS     5$              ;BRANCH BACK IF MORE BITS TO TEST
 1016  022462  062700  000002                  ADD     #2,R0           ;GET NEXT PDR ADDRESS IN R0
 1017  022466  077330                          SOB     R3,3$           ;BRANCH BACK UNTIL ALL PDR'S TESTED
 1018  022470  022700  177620                  CMP     #UIPDR7+2,R0    ;HAVE USER PDR'S BEEN TESTED?
 1019  022474  103003                          BHIS    7$              ;BRANCH IF YES
 1020  022476  012700  177600                  MOV     #UIPDR0,R0      ;LOAD FIRST USER PDR ADDR. IN R0
 1021  022502  000735                          BR      2$              ;BRANCH BACK TO TEST USER PDR'S
 1022  022504  012737  022372  001110  7$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
 1023                                                                  ;LEAVE TEST WITH ALL WRITEABLE BITS IN
 1024                                                                  ;ALL PDR'S = 1
 1025
 1033                          ;;*****************************************************************
  (3)                          ;*TEST 17       TEST FOR DUAL BYTE ADDRESSING OF KERNEL & USER PAR'S
  (4)                          ;*
  (4)                          ;*      THE FOLLOWING TEST WRITES TO BOTH BYTES OF THE KERNEL & USER
  (4)                          ;*      PAR'S SEPERATELY TO SEE THAT WRITING TO ONE DOES NOT EFFECT
  (4)                          ;*      THE OTHER.
  (4)                          ;*
  (3)                          ;;*****************************************************************
  (2)  022512  000004          TST17:  SCOPE
 1034
 1035
 1036  022514  012700  172340          1$:     MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST PAR INTO R0
 1037  022520  012737  022532  001110  2$:     MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
 1038  022526  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER TO DO 8 PAR'S
 1039  022532  012701  177777          3$:     MOV     #-1,R1          ;LOAD TEST PATTERN INTO R1
 1040  022536  005010                          CLR     (R0)            ;CLEAR THE PAR
 1041  022540  110110                          MOVB    R1,(R0)         ;WRITE 1'S TO THE LOW BYTE OF THE PAR
 1042  022542  011002                          MOV     (R0),R2         ;READ THE ENTIRE PAR INTO R2
 1043  022544  042701  177400                  BIC     #177400,R1      ;MASK HIGH BYTE & UNUSED BITS OUT OF THE DATA
 1044  022550  020102                          CMP     R1,R2           ;WAS ONLY THE LOW BYTE WRITTEN TO
 1045  022552  001401                          BEQ     4$              ;BRANCH IF YES
 1046  022554  104015                          ERROR   15              ;HIGH BYTE EFFECTED BY WRITING LOW BYTE IN PAR
 1047                                                                  ;FOR TIGHTER SCOPE LOOP
 1048                                                                  ;REPLACE ERROR CALL WITH
 1049                                                                  ;'BR 3$'' = 000766
 1050  022556  012737  022564  001110  4$:     MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
 1051  022564  005010                  5$:     CLR     (R0)            ;CLEAR THE PAR
 1052  022566  012701  177777                  MOV     #-1,R1          ;LOAD TEST, PATTERN INTO R1
 1053  022572  110160  000001                  MOVB    R1,1(R0)        ;WRITE 1'S TO THE HIGH BYTE OF THE PAR
 1054  022576  011002                          MOV     (R0),R2         ;READ THE ENTIRE PAR INTO R2
 1055  022600  042701  000377                  BIC     #000377,R1      ;MASK LOW BYTE
```

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1056  022604  020102                        CMP     R1,R2           ;WAS ONLY THE HIGH BYTE WRITTEN TO?
1057  022606  001401                        BEQ     6$              ;BRANCH IF YES
1058  022610  104015                        ERROR   15              ;LOW BYTE EFFECTED BY WRITING HIGH BYTE IN PAR
1059                                                                ;FOR TIGHTER SCOPE LOOP
1060                                                                ;REPLACE ERROR CALL WITH
1061                                                                ;'BR 5'' = 000765
1062  022612  062700  000002          6$:     ADD     #2,R0           ;PUT ADDRESS OF NEXT PAR IN R0
1063  022616  077333                        SOB     R3,3$           ;BRANCH BACK UNTIL 8 PAR'S TESTED
1064  022620  022700  177660                CMP     #UIPAR7+2,R0    ;HAVE USER PAR'S BEEN TESTED
1065  022624  103003                        BHIS    7$              ;BRANCH IF YES
1066  022626  012700  177640                MOV     #UIPAR0,R0      ;LOAD ADDRESS OF FIRST USER PAR IN R0
1067  022632  000732                        BR      2$              ;BRANCH BACK TO TEST USER PAR'S
1068  022634  012737  022514  001110  7$:   MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1069
1077                                ;;*****************************************************************
 (3)                                ;*TEST 20       TEST FOR DUAL BYTE ADDRESSING OF KERNEL & USER PDR'S
 (4)                                ;*
 (4)                                ;*      THE FOLLOWING TEST WRITES TO BOTH BYTES OF THE KERNEL & USER
 (4)                                ;*      PDR'S SEPERATELY TO SEE THAT WRITING TO ONE DOES NOT EFFECT
 (4)                                ;*      THE OTHER.
 (4)                                ;*
 (3)                                ;;*****************************************************************
 (2)  022642  000004                TST20:  SCOPE
1078
1079  022644  012700  172300          1$:     MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST PDR INTO R0
1080  022650  012737  022662  001110  2$:     MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
1081  022656  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER TO DO 8 PDR'S
1082  022662  012701  177777          3$:     MOV     #-1,R1          ;LOAD TEST PATTERN INTO R1
1083  022666  005010                        CLR     (R0)            ;CLEAR THE PDR
1084  022670  110110                        MOVB    R1,(R0)         ;WRITE 1'S TO THE LOW BYTE OF THE PDR
1085  022672  011002                        MOV     (R0),R2         ;READ THE ENTIRE PDR INTO R2
1086  022674  042701  177761                BIC     #177761,R1      ;MASK HIGH BYTE & UNUSED BITS OUT OF DATA
1087  022700  020102                        CMP     R1,R2           ;WAS ONLY THE LOW BYTE WRITTEN TO?
1088  022702  001401                        BEQ     4$              ;BRANCH IF YES
1089  022704  104015                        ERROR   15              ;HIGH BYTE EFFECTED BY WRITING LOW BYTE IN PDR
1090                                                                ;FOR TIGHTER SCOPE LOOP
1091                                                                ;REPLACE ERROR CALL WITH
1092                                                                ;'BR 3$'' = 000766
1093  022706  012737  022714  001110  4$:     MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
1094  022714  005010                  5$:     CLR     (R0)            ;CLEAR THE PDR
1095  022716  012701  177777                  MOV     #-1,R1          ;LOAD TEST PATTERN INTO R1
1096  022722  110160  000001                  MOVB    R1,1(R0)        ;WRITE 1'S TO THE HIGH BYTE OF THE PDR
1097  022726  011002                        MOV     (R0),R2         ;READ THE ENTIRE PDR INTO R2
1098  022730  042701  100377                BIC     #100377,R1      ;MASK LOW BYTE & UNUSED BITS OUT OF DATA
1099  022734  020102                        CMP     R1,R2           ;WAS ONLY THE HIGH BYTE WRITTEN TO?
1100  022736  001401                        BEQ     6$              ;BRANCH IF YES
1101  022740  104015                        ERROR   15              ;LOW BYTE EFFECTED BY WRITING HIGH BYTE IN PDR
1102                                                                ;FOR TIGHTER SCOPE LOOP
1103                                                                ;REPLACE ERROR CALL WITH
1104                                                                ;'BR 5$'' = 000765
1105  022742  062700  000002          6$:     ADD     #2,R0           ;PUT ADDRESS OF NEXT PDR IN R0
1106  022746  077333                        SOB     R3,3$           ;BRANCH BACK UNTIL 8 PDR'S TESTED
1107  022750  022700  177620                CMP     #UIPDR7+2,R0    ;HAVE USER PDR'S BEEN TESTED?
1108  022754  103003                        BHIS    7$              ;BRANCH IF YES
1109  022756  012700  177600                MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
1110  022762  000732                        BR      2$              ;BRANCH BACK TO TEST USER PDR'S
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 1111  022764  012737  022644  001110  7$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
 1112
 1124                                          ;;*****************************************************************
  (3)                                          ;*TEST 21       PAR-PDR DUAL ADDRESSING TEST
  (4)                                          ;*
  (4)                                          ;*      THE FOLLOWING TEST SETS ALL OF THE WRITEABLE BITS TO 1
  (4)                                          ;*      IN THE SIXTEEN (16) PAR'S AND PDR'S USING THE ''SETREG''
  (4)                                          ;*      SUBROUTINE AND THEN CLEARS JUST ONE OF THEM.  THE ''CMPREG''
  (4)                                          ;*      SUBROUTINE IS USED TO READ ALL OF THE PAR'S AND PDR'S TO SEE
  (4)                                          ;*      THAT ONLY ONE REGISTER WAS CLEARED IN RESPONSE TO THAT ONE
  (4)                                          ;*      PAR OR PDR ADDRESS.  THE ''CMPREG'' SUBROUTINE REPORTS THE
  (4)                                          ;*      ADDRESS OF ANY REGISTER WHOSE BITS DID NOT REMAIN SET WHEN
  (4)                                          ;*      ANOTHER REGISTER WAS CLEARED.
  (3)                                          ;*****************************************************************
  (2)  022772  000004                  TST21:  SCOPE
 1125
 1126  022774  012737  023016  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER 2$
 1127  023002  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
 1128  023006  012700  172300                  MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PDR AND R0
 1129  023012  004737  035166                  JSR     PC,SETREG       ;SET ALL BITS IN ALL PAR'S IN PDR'S
 1130  023016  012706  001100          2$:     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
 1131  023022  005010                          CLR     (R0)            ;CLEAR ONE OF THE KERNEL PDR'S
 1132  023024  004737  035260                  JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
 1133  023030  012720  177777                  MOV     #-1,(R0)+       ;RESTORE ALL ONES, AND SETUP FOR NEXT PDR
 1134  023034  077310                          SOB     R3,2$           ;LOOP TO 2$ UNTIL ALL KERNEL PDR'S CHECKED
 1135  023036  012737  023054  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
 1136  023044  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
 1137  023050  012700  172340                  MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R0
 1138  023054  012706  001100          3$:     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
 1139  023060  005010                          CLR     (R0)            ;CLEAR ONE OF THE KERNEL PAR'S
 1140  023062  004737  035260                  JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
 1141  023066  012720  177777                  MOV     #-1,(R0)+       ;RESTORE ALL ONES, AND SETUP FOR NEXT PAR
 1142  023072  077310                          SOB     R3,3$           ;LOOP TO 3$ UNTIL ALL KERNEL PAR'S CHECKED
 1143  023074  012737  023112  001110          MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
 1144  023102  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
 1145  023106  012700  177600                  MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
 1146  023112  012706  001100          4$:     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
 1147  023116  005010                          CLR     (R0)            ;CLEAR ONE OF THE USER PDR'S
 1148  023120  004737  035260                  JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
 1149  023124  012720  177777                  MOV     #-1,(R0)+       ;RESTORE ALL ONES, AND SETUP FOR NEXT UPDR
 1150  023130  077310                          SOB     R3,4$           ;LOOP TO 4$ UNTIL ALL USER PDR'S CHECKED
 1151  023132  012737  023150  001110          MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
 1152  023140  012703  000010                  MOV     #10,R3          ;LOAD LOOP COUNTER WITH AN 8
 1153  023144  012700  177640                  MOV     #UIPAR0,R0      ;LOAD ADDRESS OF FIRST USER PAR IN R0
 1154  023150  012706  001100          5$:     MOV     #KERSTK,KSP     ;SETUP STACK POINTER
 1155  023154  005010                          CLR     (R0)            ;CLEAR ONE OF THE USER PAR'S
 1156  023156  004737  035260                  JSR     PC,CMPREG       ;SEE IF OTHER PAR/PDR'S WERE EFFECTED
 1157  023162  012720  177777                  MOV     #-1,(R0)+       ;RESTORE ALL ONES, AND SETUP FOR NEXT UPAR
 1158  023166  077310                          SOB     R3,5$           ;LOOP TO 5$ UNTIL ALL USER PAR'S CHECKED
 1159  023170  012737  022774  001110          MOV     #1$,$LPERR      ;SET LOOP ON ERROR POINTER TO 1$
 1160
 1170                                          ;;*****************************************************************
  (3)                                          ;*TEST 22       TEST THAT PAR-PDR'S NOT AFFECTED BY RESET
  (4)                                          ;*
  (4)                                          ;*      THIS TEST CHECKS TO SEE THAT THE KERNEL OR USER PAR/PDR'S ARE
  (4)                                          ;*      NOT AFFECTED BY THE EXECUTION OF A ''RESET'' INSTRUCTION.  THE
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                        ;*      ''SETREG'' SUBROUTINE IS USED TO SET ALL WRITEABLE BITS TO A ''1'' IN
                        ;*      THE PAR/PDR'S.  THEN THEY ARE READ TO SEE THAT THEY REMAINED
                        ;*      UNCHANGED
                        ;*
                        ;;**********************************************************************
(2)  023176  000004     TST22:  SCOPE
1171
1172
1173  023200  004737  035166    1$:     JSR     PC,SETREG       ;SET ALL BITS IN ALL PAR'S AND PDR'S
1174  023204  000005             RESET                           ;ISSUE AN ''INIT'' BY EXECUTING A RESET
1175  023206  012700  172300            MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PDR IN R0
1176  023212  012704  000010            MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
1177  023216  011001            2$:     MOV     (R0),R1         ;READ A KERNEL PDR INTO R1
1178  023220  022701  077416            CMP     #77416,R1       ;ARE ALL THE BITS STILL SET?
1179  023224  001401                    BEQ     3$              ;BRANCH IF YES
1180  023226  104055                    ERROR   55              ;KERNEL PDR AFFECTED BY A RESET
1181                                                            ;FOR TIGHTER SCOPE LOOP
1182                                                            ;REPLACE ERROR CALL WITH
1183                                                            ;''BR 2$'' = 000773
1184  023230  062700  000002    3$:     ADD     #2,R0           ;FORM ADDRESS OF NEXT KERNEL PDR
1185  023234  077410                    SOB     R4,2$           ;LOOP TO 2$ UNTIL ALL KERNEL PDR'S CHECKED
1186  023236  012700  172340            MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R0
1187  023242  012704  000010            MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
1188  023246  011001            4$:     MOV     (R0),R1         ;READ A KERNEL PAR INTO R1
1189  023250  022701  177777            CMP     #177777,R1      ;ARE ALL THE BITS STILL SET?
1190  023254  001401                    BEQ     5$              ;BRANCH IF YES
1191  023256  104055                    ERROR   55              ;KERNEL PAR AFFECTED BY A RESET
1192                                                            ;FOR TIGHTER SCOPE LOOP
1193                                                            ;REPLACE ERROR CALL WITH
1194                                                            ;''BR 4$'' = 000773
1195  023260  062700  000002    5$:     ADD     #2,R0           ;FORM ADDRESS OF NEXT KERNEL PAR
1196  023264  077410                    SOB     R4,4$           ;LOOP TO 4$ UNTIL ALL KERNEL PAR'S CHECKED
1197  023266  012700  177600            MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
1198  023272  012704  000010            MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
1199  023276  011001            6$:     MOV     (R0),R1         ;READ A USER PDR INTO R1
1200  023300  022701  077416            CMP     #77416,R1       ;ARE ALL THE BITS STILL SET?
1201  023304  001401                    BEQ     7$              ;BRANCH IF YES
1202  023306  104055                    ERROR   55              ;USER PDR AFFECTED BY A RESET
1203                                                            ;FOR TIGHTER SCOPE LOOP
1204                                                            ;REPLACE ERROR CALL WITH
1205                                                            ;''BR 6$'' = 000773
1206  023310  062700  000002    7$:     ADD     #2,R0           ;FORM ADDRESS OF NEXT USER PDR
1207  023314  077410                    SOB     R4,6$           ;LOOP TO 6$ UNTIL ALL USER PDR'S CHECKED
1208
1209  023316  012700  177640            MOV     #UIPAR0,R0      ;LOAD ADDRESS OF FIRST USER PAR IN R0
1210  023322  012704  000010            MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
1211  023326  011001            8$:     MOV     (R0),R1         ;READ A USER PAR INTO R1
1212  023330  022701  177777            CMP     #177777,R1      ;ARE ALL THE BITS STILL SET?
1213  023334  001401                    BEQ     9$              ;BRANCH IF YES
1214  023336  104055                    ERROR   55              ;USER PAR AFFECTED BY A RESET
1215                                                            ;FOR TIGHTER SCOPE LOOP
1216                                                            ;REPLACE ERROR CALL WITH
1217                                                            ;''BR 8$'' = 000773
1218  023340  062700  000002    9$:     ADD     #2,R0           ;FORM ADDRESS OF NEXT USER PAR
1219  023344  077410                    SOB     R4,8$           ;LOOP TO 8$ UNTIL ALL USER PAR'S CHECKED
1236                        ;;**********************************************************************
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                        ;*TEST 23       RELOCATION & ADDER TEST (NO CARRIES)
                        ;*
                        ;*      THE FOLLOWING TEST SETS UP THE KERNEL PAR'S AND PDR'S
                        ;*      FOR THE REST OF THE PROGRAM.  IT THEN USES DIFFERENT
                        ;*      VIRTUAL ADDRESSES AND DIFFERENT VALUES FOR KERNEL PAR 4
                        ;*      TO PUT DIFFERENT PATTERNS AT THE INPUTS OF THE
                        ;*      MEMORY MANAGEMENT ADDER.  THE VALUES ARE SUCH
                        ;*      THAT NO CARRIES ARE GENERATED OUT OF THE ADDER.
                        ;*
                        ;*      THE METHOD USED TO SEE THAT THE RIGHT PHYSICAL BUS ADDRESS
                        ;*      IS FORMED BY THE ADDER IS TO WRITE A PATTERN TO VIRTUAL
                        ;*      LOCATION WITH MEMORY MGMT., AND
                        ;*      THEN READ THAT LOCATION USING THE PHYSICAL ADDRESS THAT SHOULD
                        ;*      HAVE BEEN FORMED TO SEE IF THE TEST PATTERN GOT THEIR.
                        ;*      22-BIT AND 18-BIT ADDRESSING AR.. USED.
                        ;;*****************************************************************
023346  000004          TST23:  SCOPF

023350  012700  172340  1$:     MOV     #KIPAR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R0
023354  005001                  CLR     R1              ;CLEAR R1
023356  012702  000007          MOV     #7,R2           ;LOAD LOOP COUNTER WITH A 7
023362  010120          2$:     MOV     R1,(R0)+        ;MAP KERNEL PAR'S TO PAGES 0-6 (4K EACH)
023364  062701  000200          ADD     #200,R1
023370  077204                  SOB     R2,2$           ;LOOP UNTIL KIPAR0 - KIPAR6 ARE LOADED
023372  012710  007600          MOV     #7600,(R0)      ;MAP KIPAR7 TO THE I/O PAGE
023376  012700  172300          MOV     #KIPDR0,R0      ;LOAD ADDRESS OF FIRST KERNEL PDR IN R0
023402  012701  077406          MOV     #77406,R1       ;LOAD PDR DATA INTO R1
023406  012702  000010          MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
023412  010120          3$:     MOV     R1,(R0)+        ;MAP ALL 8 PAGES 128 BLOCKS, UPWARD
023414  077202                  SOB     R2,3$           ;       EXPANDABLE, READ/WRITE

023416  012737  023416  00'110  4$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
(1)     023424  012700  067776          MOV     #67776,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
(1)     023430  012701  107776          MOV     #107776,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
(1)     023434  012702  125250          MOV     #125250,R2      ;LOAD TEST PATTERN INTO R2
(1)     023440  012704  000600          MOV     #600,R4 ;LOAD R4 WITH PAR VALUE
(1)     023444  010437  172350          MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <15:00>
(1)     023450  011037  001176          MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
(1)     023454  052737  000021  177572  BIS     #21,SR0         ;TURN ON MEM. MGNT. 22-BIT ADDRESSING
(1)     023462  010211                  MOV     R2,(R1)         ;LOAD 125250 USING ADDER  (PAR4 + VIRT ADDR.)
(1)     023464  000005                  RESET                   ;TURN OFF MEMORY MGMT.
(1)     023466  011003                  MOV     (R0),R3         ;READ 125250 BACK WITHOUT USING MEM. MGMT.
(1)     023470  013710  001176          MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
(1)     023474  020203                  CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
(1)                                                             ;WRITTEN USING MEMORY MANAGEMENT?
(1)     023476  001405                  BEQ     5$              ;BRANCH IF YES
(1)     023500  010137  001306          MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
(1)     023504  004737  035452          JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
(1)     023510  104017                  ERROR   17              ;TEST LOCATION DID NOT HAVE PATTERN
(1)                                                             ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
(1)                                                             ;APPARENTLY PHYSICAL ADDR. WAS
(1)                                                             ;FORMED WRONG BY ADDERS USING
(1)                                                             ;THE VIRTUAL ADDR. AND KIPAR4
(1)                                                             ;FOR TIGHTER SCOPE LOOP
(1)                                                             ;REPLACE ERROR CALL WITH
(1)                                                             ;'BR 4$' = 000742
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  (1)  023512                          5$:
1252   023512  012737  023512  001110  6$:     MOV     #6$,$LPERR      ;SET LOOP ON ERROR POINTER TO 6$
  (1)  023520  012700  067776          MOV     #67776,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
  (1)  023524  012701  102576          MOV     #102576,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
  (1)  023530  012702  125251          MOV     #125251,R2      ;LOAD TEST PATTERN INTO R2
  (1)  023534  012704  000652          MOV     #652,R4 ;LOAD R4 WITH PAR VALUE
  (1)  023540  010437  172350          MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <15:00>
  (1)  023544  011037  001176          MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
  (1)  023550  052737  000021  177572  BIS     #21,SR0         ;TURN ON MEM. MGNT. 22-BIT ADDRESSING
  (1)  023556  010211                  MOV     R2,(R1)         ;LOAD 125251 USING ADDER  (PAR4 + VIRT ADDR.)
  (1)  023560  000005                  RESET                   ;TURN OFF MEMORY MGMT.
  (1)  023562  011003                  MOV     (R0),R3         ;READ 125251 BACK WITHOUT USING MEM. MGMT.
  (1)  023564  013710  001176          MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
  (1)  023570  020203                  CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
  (1)                                                          ;WRITTEN USING MEMORY MANAGEMENT?
  (1)  023572  001405                  BEQ     7$              ;BRANCH IF YES
  (1)  023574  010137  001306          MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
  (1)  023600  004737  035452          JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
  (1)  023604  104017                  ERROR   17              ;TEST LOCATION DID NOT HAVE PATTERN
  (1)                                                          ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
  (1)                                                          ;APPARENTLY PHYSICAL ADDR. WAS
  (1)                                                          ;FORMED WRONG BY ADDERS USING
  (1)                                                          ;THE VIRTUAL ADDR. AND KIPAR4
  (1)                                                          ;FOR TIGHTER SCOPE LOOP
  (1)                                                          ;REPLACE ERROR CALL WITH
  (1)                                                          ;'BR 6$'' = 000742
  (1)  023606                          7$:
1253   023606  012737  023606  001110  8$:     MOV     #8$,$LPERR      ;SET LOOP ON ERROR POINTER TO 8$
  (1)  023614  012700  067776          MOV     #67776,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
  (1)  023620  012701  105276          MOV     #105276,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
  (1)  023624  012702  125252          MOV     #125252,R2      ;LOAD TEST PATTERN INTO R2
  (1)  023630  012704  000625          MOV     #625,R4 ;LOAD R4 WITH PAR VALUE
  (1)  023634  010437  172350          MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <15:00>
  (1)  023640  011037  001176          MOV     (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
  (1)  023644  052737  000021  177572  BIS     #21,SR0         ;TURN ON MEM. MGNT. 22-BIT ADDRESSING
  (1)  023652  010211                  MOV     R2,(R1)         ;LOAD 125252 USING ADDER  (PAR4 + VIRT ADDR.)
  (1)  023654  000005                  RESET                   ;TURN OFF MEMORY MGMT.
  (1)  023656  011003                  MOV     (R0),R3         ;READ 125252 BACK WITHOUT USING MEM. MGMT.
  (1)  023660  013710  001176          MOV     $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
  (1)  023664  020203                  CMP     R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
  (1)                                                          ;WRITTEN USING MEMORY MANAGEMENT?
  (1)  023666  001405                  BEQ     9$              ;BRANCH IF YES
  (1)  023670  010137  001306          MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
  (1)  023674  004737  035452          JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
  (1)  023700  104017                  ERROR   17              ;TEST LOCATION DID NOT HAVE PATTERN
  (1)                                                          ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
  (1)                                                          ;APPARENTLY PHYSICAL ADDR. WAS
  (1)                                                          ;FORMED WRONG BY ADDERS USING
  (1)                                                          ;THE VIRTUAL ADDR. AND KIPAR4
  (1)                                                          ;FOR TIGHTER SCOPE LOOP
  (1)                                                          ;REPLACE ERROR CALL WITH
  (1)                                                          ;'BR 8$'' = 000742
  (1)  023702                          9$:
1254
1255   023702  012737  023702  001110  10$:    MOV     #10$,$LPERR     ;SET LOOP ON ERROR POINTER TO 10$
1256   023710  012700  177776          MOV     #PSW,R0         ;LOAD PHYS. ADDR. OF PSW INTO R0
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1257  023714  012701  100076            MOV     #100076,R1      ;LOAD VIRTUAL ADDR. FOR PSW INTO R1
1258  023720  012702  030340            MOV     #030340,R2      ;LOAD DATA FOR PSW IN R2
1259  023724  012704  007777            MOV     #7777,R4        ;LOAD R4 WITH PAR VALUE
1260  023730  010437  172350            MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <11:00>
1261  023734  005010                    CLR     (R0)            ;CLEAR THE PSW
1262  023736  052737  000001  177572    BIS     #BIT0,SR0       ;TURN ON 'MEMORY MANAGEMENT'' (18 BIT ADDRESSING)
1263  023744  010211                    MOV     R2,(R1)         ;LOAD PSW USING ADDER (PAR4 + VIRT ADDR.)
1264  023746  000005                    RESET                   ;TURN OFF MEM. MGMT (SR0=0)
1265  023750  011003                    MOV     (R0),R3         ;READ PSW BACK WITHOUT USING MEM. MGMT.
1266  023752  005010                    CLR     (R0)            ;CLEAR THE PSW
1267  023754  042703  000037            BIC     #37,R3          ;MASK T-BIT & CC BITS OUT OF DATA READ
1268  023760  020203                    CMP     R2,R3           ;WAS PSW WRITTEN?
1269  023762  001405                    BEQ     11$             ;BRANCH IF YES
1270  023764  010137  001306            MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
1271  023770  004737  035452            JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDR. FOR TYPING
1272  023774  104017                    ERROR   17              ;PSW DID NOT HAVE DATA THAT IT SHOULD HAVE,
1273                                                            ;APPARENTLY PHYS. ADDR. OF PSW WAS
1274                                                            ;NOT FORMED BY ADDERS USING THE
1275                                                            ;VIRTUAL ADDR. AND KIPAR4
1276                                                            ;FOR TIGHTER SCOPE LOOP
1277                                                            ;REPLACE ERROR CALL WITH
1278                                                            ;'BR 10$'' = 000742
1279  023776  012737  023776  001110  11$:    MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
1280  024004  012700  177776            MOV     #PSW,R0         ;LOAD PHYS. ADDR. OF PSW INTO R0
1281  024010  012701  117776            MOV     #117776,R1      ;LOAD VIRTUAL ADDR. FOR PSW INTO R1
1282  024014  012702  030240            MOV     #030240,R2      ;LOAD DATA FOR PSW IN R2
1283  024020  012704  177600            MOV     #177600,R4      ;LOAD R4 WITH PAR VALUE
1284  024024  010437  172350            MOV     R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <15:00>
1285  024030  052737  000021  177572    BIS     #21,SR0         ;TURN ON 'MEMORY MANAGEMENT''(22 BIT ADDRESSING)
1286  024036  010211                    MOV     R2,(R1)         ;LOAD PSW USING ADDER (PAR4 + VIRT. ADDR.)
1287  024040  000005                    RESET                   ;TURN OFF MEM. MGMT (SR0=0)
1288  024042  011003                    MOV     (R0),R3         ;READ PSW BACK WITHOUT USING MEM. MGMT.
1289  024044  005010                    CLR     (R0)            ;CLEAR THE PSW
1290  024046  042703  000037            BIC     #37,R3          ;MASK T-BIT & CC BITS OUT OF DATA READ
1291  024052  020203                    CMP     R2,R3           ;WAS PSW WRITTEN?
1292  024054  001405                    BEQ     12$             ;BRANCH IF YES
1293  024056  010137  001306            MOV     R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYSICAL ADDR.
1294  024062  004737  035452            JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDR. FOR TYPING
1295  024066  104017                    ERROR   17              ;PSW DID NOT HAVE DATA THAT IT SHOULD
1296                                                            ;HAVE, APPARENTLY PHYS. ADDR. OF PSW WAS
1297                                                            ;NOT FORMED BY ADDERS USING THE
1298                                                            ;VIRTUAL ADDR. AND KIPAR4
1299                                                            ;FOR TIGHTER SCOPE LOOP
1300                                                            ;REPLACE ERROR CALL WITH
1301                                                            ;'BR 11$'' = 000743
1302  024070  012737  023350  001110  12$:    MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1303
1315                                ;;*****************************************************************
 (3)                                ;*TEST 24       RELOCATION & ADDER TEST (WITH CARRIES)
 (4)                                ;*
 (4)                                ;*      THE FOLLOWING TEST USES THE SAME METHOD AS THE PREVIOUS
 (4)                                ;*      TEST TO VERIFY MEMORY MANAGEMENTS ABILITY TO CONSTRUCT
 (4)                                ;*      PHYSICAL BUS ADDRESSES USING A VIRTUAL BUS ADDRESS AND THE
 (4)                                ;*      CONTENTS OF A PAGE ADDRESS REGISTER.  HOWEVER, THE VALUES
 (4)                                ;*      AND PATTERNS USED IN THIS TEST WILL GENERATE CARRIES
 (4)                                ;*      AND CHECK 'WRAPAROUND'' TO ADDRESS 000000 BY
```

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 (4)                                  ;*      USING VIRTUAL ADDR. 111400 AND KIPAR4 = 177664.
 (4)                                  ;*      22-BIT ADDRESSING IS USED.
 (3)                                  ;;**********************************************************************
 (2)  024076  000004                  TST24:  SCOPE
1316
1317  024100                          1$:                                 ;KERNEL PAR'S AND PDR'S HAVE BEEN
1318                                                                      ;SETUP BY THE PREVIOUS TEST
1319  024100  012737  024100  001110  2$:     MOV     #2$,$LPERR          ;SET LOOP ON ERROR POINTER TO 2$
 (1)  024106  012700  066476          MOV     #66476,R0           ;LOAD PHYSICAL ADDR. PBA INTO R0
 (1)  024112  012701  114376          MOV     #114376,R1          ;LOAD VIRTUAL ADDR. VBA INTO R1
 (1)  024116  012702  125253          MOV     #125253,R2          ;LOAD TEST PATTERN INTO R2
 (1)  024122  012704  000521          MOV     #521,R4 ;LOAD R4 WITH PAR VALUE
 (1)  024126  010437  172350          MOV     R4,KIPAR4           ;LOAD KERNEL PAR 4 BITS <15:00>
 (1)  024132  011037  001176          MOV     (R0),$TMP0          ;SAVE CONTENTS AT TEST LOCATION
 (1)  024136  052737  000021  177572  BIS     #21,SR0             ;TURN ON MEM. MGNT. 22-BIT ADDRESSING
 (1)  024144  010211                  MOV     R2,(R1)             ;LOAD 125253 USING ADDER  (PAR4 + VIRT ADDR.)
 (1)  024146  000005                  RESET                       ;TURN OFF MEMORY MGMT.
 (1)  024150  011003                  MOV     (R0),R3             ;READ 125253 BACK WITHOUT USING MEM. MGMT.
 (1)  024152  013710  001176          MOV     $TMP0,(R0)          ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
 (1)  024156  020203                  CMP     R2,R3               ;WAS SAME PATTERN READ BACK THAT WAS
 (1)                                                              ;WRITTEN USING MEMORY MANAGEMENT?
 (1)  024160  001405                  BEQ     3$                  ;BRANCH IF YES
 (1)  024162  010137  001306          MOV     R1,VIRT1            ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
 (1)  024166  004737  035452          JSR     PC,FORMPA           ;GO FORM PHYSICAL ADDRESS FOR TYPING
 (1)  024172  104017                  ERROR   17                  ;TEST LOCATION DID NOT HAVE PATTERN
 (1)                                                              ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
 (1)                                                              ;APPARENTLY PHYSICAL ADDR. WAS
 (1)                                                              ;FORMED WRONG BY ADDERS USING
 (1)                                                              ;THE VIRTUAL ADDR. AND KIPAR4
 (1)                                                              ;FOR TIGHTER SCOPE LOOP
 (1)                                                              ;REPLACE ERROR CALL WITH
 (1)                                                              ;'BR 2$'' = 000742
 (1)  024174                          3$:
1320  024174  012737  024174  001110  4$:     MOV     #4$,$LPERR          ;SET LOOP ON ERROR POINTER TO 4$
 (1)  024202  012700  062276          MOV     #62276,R0           ;LOAD PHYSICAL ADDR. PBA INTO R0
 (1)  024206  012701  107376          MOV     #107376,R1          ;LOAD VIRTUAL ADDR. VBA INTO R1
 (1)  024212  012702  125254          MOV     #125254,R2          ;LOAD TEST PATTERN INTO R2
 (1)  024216  012704  000527          MOV     #527,R4 ;LOAD R4 WITH PAR VALUE
 (1)  024222  010437  172350          MOV     R4,KIPAR4           ;LOAD KERNEL PAR 4 BITS <15:00>
 (1)  024226  011037  001176          MOV     (R0),$TMP0          ;SAVE CONTENTS AT TEST LOCATION
 (1)  024232  052737  000021  177572  BIS     #21,SR0             ;TURN ON MEM. MGNT. 22-BIT ADDRESSING
 (1)  024240  010211                  MOV     R2,(R1)             ;LOAD 125254 USING ADDER  (PAR4 + VIRT ADDR.)
 (1)  024242  000005                  RESET                       ;TURN OFF MEMORY MGMT.
 (1)  024244  011003                  MOV     (R0),R3             ;READ 125254 BACK WITHOUT USING MEM. MGMT.
 (1)  024246  013710  001176          MOV     $TMP0,(R0)          ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
 (1)  024252  020203                  CMP     R2,R3               ;WAS SAME PATTERN READ BACK THAT WAS
 (1)                                                              ;WRITTEN USING MEMORY MANAGEMENT?
 (1)  024254  001405                  BEQ     5$                  ;BRANCH IF YES
 (1)  024256  010137  001306          MOV     R1,VIRT1            ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
 (1)  024262  004737  035452          JSR     PC,FORMPA           ;GO FORM PHYSICAL ADDRESS FOR TYPING
 (1)  024266  104017                  ERROR   17                  ;TEST LOCATION DID NOT HAVE PATTERN
 (1)                                                              ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
 (1)                                                              ;APPARENTLY PHYSICAL ADDR. WAS
 (1)                                                              ;FORMED WRONG BY ADDERS USING
 (1)                                                              ;THE VIRTUAL ADDR. AND KIPAR4
 (1)                                                              ;FOR TIGHTER SCOPE LOOP
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 (1)                                                        ;REPLACE ERROR CALL WITH
 (1)                                                        ;'BR 4$'' = 000742
 (1)  024270                                5$:
1321  024270  012737  024270  001110  6$:    MOV   #6$,$LPERR      ;SET LOOP ON ERROR POINTER TO 6$
 (1)  024276  012700  062076            MOV   #62076,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
 (1)  024302  012701  104576            MOV   #104576,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
 (1)  024306  012702  125255            MOV   #125255,R2      ;LOAD TEST PATTERN INTO R2
 (1)  024312  012704  000553            MOV   #553,R4 ;LOAD R4 WITH PAR VALUE
 (1)  024316  010437  172350            MOV   R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <15:00>
 (1)  024322  011037  001176            MOV   (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
 (1)  024326  052737  000021  177572     BIS   #21,SR0         ;TURN ON MEM. MGNT. 22-BIT ADDRESSING
 (1)  024334  010211                    MOV   R2,(R1)         ;LOAD 125255 USING ADDER  (PAR4 + VIRT ADDR.)
 (1)  024336  000005                    RESET                 ;TURN OFF MEMORY MGMT.
 (1)  024340  011003                    MOV   (R0),R3         ;READ 125255 BACK WITHOUT USING MEM. MGMT.
 (1)  024342  013710  001176            MOV   $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
 (1)  024346  020203                    CMP   R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
 (1)                                                        ;WRITTEN USING MEMORY MANAGEMENT?
 (1)  024350  001405                    BEQ   7$              ;BRANCH IF YES
 (1)  024352  010137  001306            MOV   R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
 (1)  024356  004737  035452            JSR   PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
 (1)  024362  104017                    ERROR 17              ;TEST LOCATION DID NOT HAVE PATTERN
 (1)                                                        ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
 (1)                                                        ;APPARENTLY PHYSICAL ADDR. WAS
 (1)                                                        ;FORMED WRONG BY ADDERS USING
 (1)                                                        ;THE VIRTUAL ADDR. AND KIPAR4
 (1)                                                        ;FOR TIGHTER SCOPE LOOP
 (1)                                                        ;REPLACE ERROR CALL WITH
 (1)                                                        ;'BR 6$'' = 000742
 (1)  024364                                7$:
1322  024364  012737  024364  001110  8$:    MOV   #8$,$LPERR      ;SET LOOP ON ERROR POINTER TO 8$
 (1)  024372  012700  000000            MOV   #00000,R0       ;LOAD PHYSICAL ADDR. PBA INTO R0
 (1)  024376  012701  111400            MOV   #111400,R1      ;LOAD VIRTUAL ADDR. VBA INTO R1
 (1)  024402  012702  125256            MOV   #125256,R2      ;LOAD TEST PATTERN INTO R2
 (1)  024406  012704  177664            MOV   #177664,R4      ;LOAD R4 WITH PAR VALUE
 (1)  024412  010437  172350            MOV   R4,KIPAR4       ;LOAD KERNEL PAR 4 BITS <15:00>
 (1)  024416  011037  001176            MOV   (R0),$TMP0      ;SAVE CONTENTS AT TEST LOCATION
 (1)  024422  052737  000021  177572     BIS   #21,SR0         ;TURN ON MEM. MGNT. 22-BIT ADDRESSING
 (1)  024430  010211                    MOV   R2,(R1)         ;LOAD 125256 USING ADDER  (PAR4 + VIRT ADDR.)
 (1)  024432  000005                    RESET                 ;TURN OFF MEMORY MGMT.
 (1)  024434  011003                    MOV   (R0),R3         ;READ 125256 BACK WITHOUT USING MEM. MGMT.
 (1)  024436  013710  001176            MOV   $TMP0,(R0)      ;RESTORE ORIGINAL CONTENTS TO TEST LOC.
 (1)  024442  020203                    CMP   R2,R3           ;WAS SAME PATTERN READ BACK THAT WAS
 (1)                                                        ;WRITTEN USING MEMORY MANAGEMENT?
 (1)  024444  001405                    BEQ   9$              ;BRANCH IF YES
 (1)  024446  010137  001306            MOV   R1,VIRT1        ;SAVE VIRTUAL ADDR. TO FORM PHYS. ADDR
 (1)  024452  004737  035452            JSR   PC,FORMPA       ;GO FORM PHYSICAL ADDRESS FOR TYPING
 (1)  024456  104017                    ERROR 17              ;TEST LOCATION DID NOT HAVE PATTERN
 (1)                                                        ;THAT SHOULD HAVE BEEN WRITTEN TO IT.
 (1)                                                        ;APPARENTLY PHYSICAL ADDR. WAS
 (1)                                                        ;FORMED WRONG BY ADDERS USING
 (1)                                                        ;THE VIRTUAL ADDR. AND KIPAR4
 (1)                                                        ;FOR TIGHTER SCOPE LOOP
 (1)                                                        ;REPLACE ERROR CALL WITH
 (1)                                                        ;'BR 8$'' = 000742
 (1)  024460                                9$:
1323  024460  012737  024100  001110        MOV   #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
```

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1324
1352                                    ;;*****************************************************************
 (3)                                    ;*TEST 25       READ AND WRITE WHILE IN RELOCATE MODE
 (4)                                    ;*
 (4)                                    ;*      THE FOLLOWING TEST TURNS ON MEMORY MANAGEMENT AND THEN
 (4)                                    ;*      READS AND WRITES LOCATIONS BETWEEN PHYSICAL ADDRESSES
 (4)                                    ;*      060000-067600.  ONE LOCATION IN EVERY BLOCK (32. WORDS)
 (4)                                    ;*      IS WRITTEN USING PAR4 AND READ USING PAR5.  THIS IS
 (4)                                    ;*      DONE IN BOTH USER AND KERNEL MODES.  THE USER PAR/PDR'S
 (4)                                    ;*      ARE SETUP AT THE BEGINNING OF THE TEST AND ONCE MEMORY
 (4)                                    ;*      MANAGEMENT IS TURNED ON IT IS LEFT ON FOR THE REST OF THE
 (4)                                    ;*      OF THE PROGRAM.  THE 'MODE'' INPUT TO THE PAR/PDR ADDRESS MUX
 (4)                                    ;*      IS CHECKED BY READING AND WRITING IN USER MODE.  REMEMBER
 (4)                                    ;*      ALSO, THAT SINCE MEMORY MANAGEMENT IS ON (IN RELOCATE
 (4)                                    ;*      MODE) THE PROGRAM ITSELF IS USING ITS VIRTUAL ADDRESSES AND
 (4)                                    ;*      THE PAR/PDR'S TO EXECUTE.
 (4)                                    ;*
 (4)                                    ;*      WHILE TESTING IN KERNEL MODE, USER PAGES 4 & 5 ARE MAPPED
 (4)                                    ;*      NON-RESIDENT WITH DIFFERENT PAR VALUES THAN THE KERNEL
 (4)                                    ;*      PAR'S TO BE SURE THAT THE KERNEL PAR'S AND PDR'S ARE BEING
 (4)                                    ;*      USED WHEN IN KERNEL MODE (AND VICE VERSA WHILE TESTING IN
 (4)                                    ;*      USER MODE).  IF A MEM. MGMT. TRAP OCCURS, THE PROGRAM GOES
 (4)                                    ;*      TO 9$ WHERE THE TRAP IS REPORTED.
 (4)                                    ;*
 (4)                                    ;*      BY SETTING THE LOCATION $MADR1 IN THE E-TABLE TO A CONSTANT,
 (4)                                    ;*      AS DESCRIBED IN THE DOCUMENTATION, THIS TEST WILL CONTINUE
 (4)                                    ;*      ACCESSING LOCATIONS THROUGHOUT MEMORY BY INCREASING THE VALUE
 (4)                                    ;*      OF PAR4 AND PAR5.
 (3)                                    ;*****************************************************************
 (2) 024466  000004                     TST25:  SCOPE
1353
1354 024470  005037  177776             1$:     CLR     PSW             ;START IN KERNEL MODE
1355 024474  012704  000577             1$:     MOV     #577,R4         ;LOAD R4 WITH VALUE FOR PAR4
1356 024500  012705  000600                     MOV     #600,R5         ;LOAD R5 WITH VALUE FOR PAR5
1357 024504  010437  172350                     MOV     R4,KIPAR4       ;LOAD KERNEL PAR4
1358 024510  010537  172352                     MOV     R5,KIPAR5       ;LOAD KERNEL PAR5
1359 024514  012700  177640                     MOV     #UIPAR0,R0      ;LOAD ADDRESS OF FIRST USER PAR IN R0
1360 024520  005001                             CLR     R1              ;CLEAR R1
1361 024522  012702  000007                     MOV     #7,R2           ;LOAD LOOP COUNTER WITH A 7
1362 024526  010120                     2$:     MOV     R1,(R0)+        ;MAP USER PAR'S TO PAGES 0-6 (4K EACH)
1363 024530  062701  000200                     ADD     #200,R1
1364 024534  077204                             SOB     R2,2$           ;LOOP UNTIL UIPAR0-UIPAR6 ARE LOADED
1365 024536  012710  177600                     MOV     #177600,(R0)    ;MAP USER PAR7 TO THE I/O PAGE
1366 024542  012700  177600                     MOV     #UIPDR0,R0      ;LOAD ADDRESS OF FIRST USER PDR IN R0
1367 024546  012701  077406                     MOV     #77406,R1       ;LOAD PDR DATA INTO R1
1368 024552  012702  000010                     MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
1369 024556  010120                     3$:     MOV     R1,(R0)+        ;MAP ALL 8 PAGES 128 BLOCKS, UPWARD
1370 024560  077202                             SOB     R2,3$           ;       EXPANDABLE, READ/WRITE
1371 024562  012737  024642  001110             MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
1372 024570  012737  025126  000250             MOV     #9$,MMVEC       ;SET M. M. TRAP VECTOR TO 9$
1373 024576  012737  000021  177572             MOV     #21,SR0         ;TURN ON MEMORY MANAGEMENT(22-BIT ADDRESSING)
1374 024604  105037  177610             10$:    CLRB    UIPDR4          ;MAP USER SPACE NON-RESIDENT WHILE
1375 024610  105037  177612                     CLRB    UIPDR5          ;       TESTING KERNEL SPACE
1376 024614  010537  177650                     MOV     R5,UIPAR4       ;MAP USER PAR'S OPPOSITE OF KIPAR'S
1377 024620  010437  177652                     MOV     R4,UIPAR5
1378 024624  013737  177776  001176     4$:     MOV     PSW,$TMP0       ;SAVE PSW IN CASE OF ERROR
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1379  024632  012700  100100          MOV     #100100,R0      ;PUT VIRTUAL ADDR. THAT USER PAR4 IN R0
1380  024636  012701  120000          MOV     #120000,R1      ;PUT VIRTUAL ADDR. THAT USES PAR5 IN R1
1381  024642  010010            5$:   MOV     R0,(R0)         ;WRITE TO TEST LOC. USING PAR4
1382  024644  011102                  MOV     (R1),R2         ;READ THE SAME LOC., BUT USING PAR5
1383  024646  020002                  CMP     R0,R2           ;DID WE READ WHAT WE WROTE?
1384  024650  001411                  BEQ     6$              ;BRANCH IF YES
1385  024652  010137  001310          MOV     R1,VIRT2        ;SAVE VIRTUAL ADDR. THAT SELECTED PAR5
1386  024656  010037  001306          MOV     R0,VIRT1        ;SAVE VIRTUAL ADDR. THAT SELECTED PAR4
1387  024662  004737  035452          JSR     PC,FORMPA       ;GO FORM PHYSICAL ADDRESS  BEING USED
1388  024666  104020                  ERROR   20              ;READING LOC. USING PAR5 AND A VIRT.
1389                                                          ;ADDR. DID NOT FIND DATA WRITTEN WHEN USING
1390                                                          ;PAR4 AND VIRT. ADDRESS.
1391                                                          ;FOR TIGHTER SCOPE LOOP
1392                                                          ;REPLACE ERROR CALL WITH
1393                                                          ;'BR 5$'' = 000765
1394  024670  013700  001306          MOV     VIRT1,R0        ;RESTORE VBA IN R0
1395  024674  062700  000100    6$:   ADD     #100,R0         ;CHANGE VIRTUAL ADDRS. TO POINT TO NEXT BLOCK
1396  024700  062701  000100          ADD     #100,R1
1397  024704  020127  127700          CMP     R1,#127700      ;WERE BLOCKS FROM 60000-676000 ALL TRIED?
1398  024710  001354                  BNE     5$              ;BRANCH IF NO
1399  024712  032737  140000  177776  BIT     #140000,PSW     ;HAVE WE DONE TEST IN USER MODE YET?
1400  024720  001026                  BNE     7$              ;BRANCH IF YES
1401  024722  010437  177650          MOV     R4,UIPAR4       ;LOAD USER PAR4
1402  024726  010537  177652          MOV     R5,UIPAR5       ;LOAD USER PAR5
1403  024732  112737  000006  177610  MOVB    #6,UIPDR4       ;MAP USER SPACE R/W TO TEST IT
1404  024740  112737  000006  177612  MOVB    #6,UIPDR5
1405  024746  105037  172310          CLRB    KIPDR4          ;MAP  KERNEL SPACE NON-RESIDENT WHILE
1406  024752  105037  172312          CLRB    KIPDR5          ;       TESTING USER SPACE
1407  024756  010537  172350          MOV     R5,KIPAR4       ;MAP KERNEL PAR'S OPPOSITE UIPAR'S
1408  024762  010437  172352          MOV     R4,KIPAR5
1409  024766  012737  140000  177776  MOV     #140000,PSW     ;GO TO USER MODE
1410  024774  000713                  BR      4$              ;GO BACK AND READ/WRITE IN JSER MODE
1411  024776  005037  177776    7$:   CLR     PSW             ;GO BACK TO KERNEL MODE BEFORE LEAVING
1412
1413  025002  020537  001260          CMP     R5,@#$MADR1     ;HAVE WE CHECKED ALL MEMORY?
1414  025006  002020                  BGE     8$              ;BRANCH IF YES
1415  025010  062704  000200          ADD     #200,R4         ;LOAD WITH NEXT VALUE FOR PAR4
1416  025014  062705  000200          ADD     #200,R5         ;LOAD WITH NEXT VALUE FOR PAR5
1417  025020  010437  172350          MOV     R4,KIPAR4       ;LOAD KERNAL PAR4
1418  025024  010537  172352          MOV     R5,KIPAR5       ;LOAD KERNAL PAR5
1419  025030  112737  000006  172310  MOVB    #6,KIPDR4       ;MAP KERNAL SPACE R/W WHILE TESTING
1420  025036  112737  000006  172312  MOVB    #6,KIPDR5
1421  025044  000137  024604          JMP     10$             ;CONTINUE TEST
1422
1423  025050  012737  077406  172310  8$:   MOV     #77406,KIPDR4   ;REMAP KERNEL PAGES READ/WRITE
1424  025056  012737  077406  172312        MOV     #77406,KIPDR5
1425  025064  012705  000600          MOV     #600,R5
1426  025070  010537  172350          MOV     R5,KIPAR4       ;MAP KERNEL  AND USER PAR'S 4 & 5
1427  025074  010537  172352          MOV     R5,KIPAR5       ;  BACK TO 12-16K
1428  025100  010537  177650          MOV     R5,UIPAR4
1429  025104  010537  177652          MOV     R5,UIPAR5
1430  025110  012737  002150  000250  MOV     #MGMERR,MMVEC   ;RESTORE ADDR. OF NORMAL M.M. TRAP ROUTINE
1431  025116  012737  024470  001110  MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1432  025124  000427                  BR      TST26           ;;GO TO NEXT TEST
1433
1434  025126  012637  001266    9$:   MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
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1435  025132  012637  001270                    MOV     (KSP)+,TRAPPS
1436                                                    ;PROGRAM WILL TRAP TO HERE IF TRY
1437                                                    ;TO USE USER PDR'S WHEN IN KERNEL MODE
1438                                                    ;OR KERNEL PDR'S WHEN IN USER MODE
1439  025136  010037  001306                    MOV     R0,VIRT1        ;SAVE VIRTUAL ADDRESS FOR ERROR REPORT
1440  025142  004737  035452                    JSR     PC,FORMPA       ;GO FORM THE PHYSICAL ADDRESS  BEING USED
1441  025146  013737  177572  001272          MOV     SR0,WASSR0      ;SAVE SR0 & SR2  FOR ERROR REPORT
1442  025154  013737  177576  001274          MOV     SR2,WASSR2
1443  025162  042737  160000  177572          BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
1444  025170  104052                          ERROR   52              ;M.M. TRAP WHILE IN RELOCATE MODE -
1445                                                    ;REFERENCED WRONG SET OF PDR'S
1446                                                    ;FOR TIGHTER SCOPE LOOP
1447                                                    ;REPLACE ERROR CALL WITH
1448                                                    ;A 'NOP' = 000240
1449  025172  013746  001270                    MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
1450  025176  013746  001266                    MOV     TRAPPC,-(KSP)
1451  025202  000002                          RTI                     ;RETURN TO TEST
1452
1453
1457                                    ;;**********************************************************************
 (3)                                    ;*TEST 26       W-BIT LOGIC TEST, KERNEL PDR'S
 (5)                                    ;*
 (5)                                    ;*      THIS TEST WRITES TO EIGHT (8) DIFFERENT VIRTUAL ADDRESSES
 (5)                                    ;*      (VBA'S = 17776,37776,57776,77776,117776,137776,157776, & 177776
 (5)                                    ;*      & PBA'S CONSTRUCTED = 17776,37776,57776,77776,77776,
 (5)                                    ;*      77776,77776, & 777776 RESPECTIVELY).
 (5)                                    ;*      WHICH SHOULD CAUSE THE 'W-BIT' TO SET IN EACH OF THE
 (5)                                    ;*      EIGHT (8) KERNEL PAGE DESCRIPTOR REGISTERS.  THE PDR'S
 (5)                                    ;*      ARE CHECKED TO SEE THAT IT'S W-BIT DOES SET WHEN THE
 (5)                                    ;*      PAGE IT IS MAPPED TO IS WRITTEN TO AND THAT THE W-BIT
 (5)                                    ;*      DOES NOT SET IN ANY OF THE OTHER PDR'S.  KERNEL PDR'S 3,4,5,6
 (5)                                    ;*      ARE MAPPED TO 12-16K FOR THIS TEST.  ALSO THE W-BIT
 (5)                                    ;*      SHOULD BE CLEARED WHEN THE PDR IS WRITTEN TO.  THE
 (5)                                    ;*      W-BIT PORTION OF THE PDR'S IS BEING CHECKED.
 (3)                                    ;;**********************************************************************
 (2)  025204  000004                    TST26:  SCOPE
1458  025206  012737  000340  177776    1$:     MOV     #340,PSW                ;LOCK OUT ALL POSSIBLE INTERRUPTS
1459  025214  004737  035100                    JSR     PC,TOFF         ;TURN T-BIT TRAPPING OFF FOR THIS TEST
 (1)  025220  012702  000004                    MOV     #4,R2           ;SET LOOP COUNTER TO 4
 (1)  025224  012700  172346                    MOV     #KIPAR3,R0      ;LOAD ADDRESS OF PAR3 INTO R0
 (1)  025230  012701  000600                    MOV     #600,R1         ;LOAD '12-16K' PAR VALUE INTO R1
 (1)  025234  010120                    2$:     MOV     R1,(R0)+        ;MAP PARS 3-6 TO 12-16K
 (1)  025236  077202                            SOB     R2,2$           ;LOOP TIL ALL 4 OF THEM LOADED
 (1)  025240  012705  172300                    MOV     #KIPDR0,R5      ;LOAD ADDRESS OF FIRST PDR TO BE TESTED IN R5
 (1)  025244  012704  000010                    MOV     #10,R4          ;SET LOOP COUNTER TO 8
 (1)  025250  012703  017776                    MOV     #17776,R3       ;INITIALIZE VIRTUAL ADDRESS TO BE IN R3
 (1)  025254  012737  025262  001110            MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
 (1)  025262  012700  172300            3$:     MOV     #KIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE SETUP IN R0
 (1)  025266  012702  000010                    MOV     #10,R2          ;SET LOOP COUNTER TO 8
 (1)  025272  012701  077406                    MOV     #77406,R1       ;PUT 'W-BIT OFF DATA' INTO R1
 (1)  025276  010120                    4$:     MOV     R1,(R0)+        ;CLEAR ALL W-BITS BY WRITING TO ALL PDRS
 (1)  025300  077202                            SOB     R2,4$           ;LOOP UNTIL ALL OF THEM SETUP
 (1)  025302  011313                            MOV     (R3),(R3)       ;DO 'DATO' TO VIRTUAL ADDR.-SETTING A W-BIT
 (1)  025304  031527  000100                    BIT     (R5),#WBIT      ;DID THAT CAUSE W-BIT TO BE SET?
 (1)  025310  001002                            BNE     5$              ;BRANCH IF YES
 (1)  025312  104021                            ERROR   21              ;W-BIT DID NOT GET SET IN PDR
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(1)                                                          ;FOR TIGHTER SCOPE LOOP
(1)                                                          ;REPLACE ERROR CALL WITH
(1)                                                          ;'BR 3$'' = 000763
(1)  025314  000422                    BR      8$            ;SKIP CHECKING OTHER PDR'S-ERROR WILL SET W-BITS
(1)  025316  012702  000010      5$:   MOV     #10,R2        ;SET LOOP COUNTER TO 8
(1)  025322  012700  172300            MOV     #KIPDR0,R0    ;LOAD ADDR. OF FIRST PDR TO BE CHECKED IN R0
(1)  025326  031027  000100      6$:   BIT     (R0),#WBIT    ;DID W-BIT IN OTHER PDRS REMAIN CLEAR?
(1)  025332  001403                    BEQ     7$            ;BRANCH IF YES
(1)  025334  020500                    CMP     R5,R0         ;IF W-BIT SET, THEN WAS IT PDR UNDER TEST?
(1)  025336  001401                    BEQ     7$            ;BRANCH IF YES
(1)  025340  104022                    ERROR   22            ;W-BIT GOT SET IN MORE THAN ONE PDR
(1)                                                          ;FOR TIGHTER SCOPE LOOP
(1)                                                          ;REPLACE ERROR CALL WITH
(1)                                                          ;'BR 3$'' = 000750
(1)  025342  062700  000002      7$:   ADD     #2,R0         ;POINT R0 TO NEXT PDR TO BE CHECKED
(1)  025346  077211                    SOB     R2,6$         ;LOOP UNTIL ALL 8 CHECKED FOR CLEAR W-BIT
(1)  025350  010115                    MOV     R1,(R5)       ;WRITE TO THE PDR TESTED TO CLEAR W-BIT
(1)  025352  031527  000100            BIT     (R5),#WBIT    ;DID WRITING PDR CLEAR THE W-BIT?
(1)  025356  001401                    BEQ     8$            ;BRANCH IF YES
(1)  025360  104023                    ERROR   23            ;W-BIT DID NOT CLEAR BY WRITING THE PDR
(1)                                                          ;FOR TIGHTER SCOPE LOOP
(1)                                                          ;REPLACE ERROR CALL WITH
(1)                                                          ;'BR 3$'' = 000740
(1)  025362  062705  000002      8$:   ADD     #2,R5         ;POINT R5 TO THE NEXT PDR TO BE TESTED
(1)  025366  062703  020000            ADD     #20000,R3     ;CHANGE VIRT. ADDR TO REF. NEXT PDR
(1)  025372  077445                    SOB     R4,3$         ;LOOP BACK TO 3$ UNTIL ALL 8 PDR'S TESTED
(1)  025374  012737  025206  001110    MOV     #1$,$LPERR    ;RESET LOOP ON ERROR POINTER TO 1$
(1)  025402  004737  035134            JSR     PC,TON        ;TURN T-BIT BACK ON FOR NEXT TEST
1460
1464                                ;;*************************************************************
(3)                                 ;*TEST 27       W-BIT LOGIC TEST, USER PDR'S
(5)                                 ;*
(5)                                 ;*      THIS TEST WRITES TO EIGHT (8) DIFFERENT VIRTUAL ADDRESSES
(5)                                 ;*      (VBA'S = 17776,37776,57776,77776,117776,137776,157776, & 177776
(5)                                 ;*      & PBA'S CONSTRUCTED = 17776,37776,57776,77776,77776,
(5)                                 ;*      77776,77776, & 777776 RESPECTIVELY).
(5)                                 ;*      WHICH SHOULD CAUSE THE 'W-BIT'' TO SET IN EACH OF THE
(5)                                 ;*      EIGHT (8) USER PAGE DESCRIPTOR REGISTERS.  THE PDR'S
(5)                                 ;*      ARE CHECKED TO SEE THAT IT'S W-BIT DOES SET WHEN THE
(5)                                 ;*      PAGE IT IS MAPPED TO IS WRITTEN TO AND THAT THE W-BIT
(5)                                 ;*      DOES NOT SET IN ANY OF THE OTHER PDR'S.  USER PDR'S 3,4,5,6
(5)                                 ;*      ARE MAPPED TO 12-16K FOR THIS TEST.  ALSO THE W-BIT
(5)                                 ;*      SHOULD BE CLEARED WHEN THE PDR IS WRITTEN TO.  THE
(5)                                 ;*      W-BIT PORTION OF THE PDR'S IS BEING CHECKED.
(3)                                 ;;*************************************************************
(2)  025406  000004                 TST27:  SCOPE
1465 025410  012737  140000  177776 1$:    MOV     #140000,PSW   ;GO TO USER MODE FOR THIS TEST
1466 025416  004737  035100            JSR     PC,TOFF       ;TURN T-BIT TRAPPING OFF FOR THIS TEST
(1)  025422  012702  000004            MOV     #4,R2         ;SET LOOP COUNTER TO 4
(1)  025426  012700  177646            MOV     #UIPAR3,R0    ;LOAD ADDRESS OF PAR3 INTO R0
(1)  025432  012701  000600            MOV     #600,R1       ;LOAD ''12-16K'' PAR VALUE INTO R1
(1)  025436  010120                 2$:    MOV     R1,(R0)+      ;MAP PARS 3-6 TO 12-16K
(1)  025440  077202                    SOB     R2,2$         ;LOOP TIL ALL 4 OF THEM LOADED
(1)  025442  012705  177600            MOV     #UIPDR0,R5    ;LOAD ADDRESS OF FIRST PDR TO BE TESTED IN R5
(1)  025446  012704  000010            MOV     #10,R4        ;SET LOOP COUNTER TO 8
(1)  025452  012703  017776            MOV     #17776,R3     ;INITIALIZE VIRTUAL ADDRESS TO BE IN R3
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    (1)  025456  012737  025464  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
    (1)  025464  012700  177600            3$:   MOV     #UIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE SETUP IN R0
    (1)  025470  012702  000010                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
    (1)  025474  012701  077406                  MOV     #77406,R1       ;PUT 'W-BIT OFF DATA'' INTO R1
    (1)  025500  010120                    4$:   MOV     R1,(R0)+        ;CLEAR ALL W-BITS BY WRITING TO ALL PDRS
    (1)  025502  077202                          SOB     R2,4$           ;LOOP UNTIL ALL OF THEM SETUP
    (1)  025504  011313                          MOV     (R3),(R3)       ;DO 'DATO'' TO VIRTUAL ADDR.-SETTING A W-BIT
    (1)  025506  031527  000100                  BIT     (R5),#WBIT      ;DID THAT CAUSE W-BIT TO BE SET?
    (1)  025512  001002                          BNE     5$              ;BRANCH IF YES
    (1)  025514  104021                          ERROR   21              ;W-BIT DID NOT GET SET IN PDR
    (1)                                                                  ;FOR TIGHTER SCOPE LOOP
    (1)                                                                  ;REPLACE ERROR CALL WITH
    (1)                                                                  ;'BR 3$'' = 000763
    (1)  025516  000422                          BR      8$              ;SKIP CHECKING OTHER PDR'S-ERROR WILL SET W-BITS
    (1)  025520  012702  000010            5$:   MOV     #10,R2          ;SET LOOP COUNTER TO 8
    (1)  025524  012700  177600                  MOV     #UIPDR0,R0      ;LOAD ADDR. OF FIRST PDR TO BE CHECKED IN R0
    (1)  025530  031027  000100            6$:   BIT     (R0),#WBIT      ;DID W-BIT IN OTHER PDRS REMAIN CLEAR?
    (1)  025534  001403                          BEQ     7$              ;BRANCH IF YES
    (1)  025536  020500                          CMP     R5,R0           ;IF W-BIT SET, THEN WAS IT PDR UNDER TEST?
    (1)  025540  001401                          BEQ     7$              ;BRANCH IF YES
    (1)  025542  104022                          ERROR   22              ;W-BIT GOT SET IN MORE THAN ONE PDR
    (1)                                                                  ;FOR TIGHTER SCOPE LOOP
    (1)                                                                  ;REPLACE ERROR CALL WITH
    (1)                                                                  ;'BR 3$'' = 000750
    (1)  025544  062700  000002            7$:   ADD     #2,R0           ;POINT R0 TO NEXT PDR TO BE CHECKED
    (1)  025550  077211                          SOB     R2,6$           ;LOOP UNTIL ALL 8 CHECKED FOR CLEAR W-BIT
    (1)  025552  010115                          MOV     R1,(R5)         ;WRITE TO THE PDR TESTED TO CLEAR W-BIT
    (1)  025554  031527  000100                  BIT     (R5),#WBIT      ;DID WRITING PDR CLEAR THE W-BIT?
    (1)  025560  001401                          BEQ     8$              ;BRANCH IF YES
    (1)  025562  104023                          ERROR   23              ;W-BIT DID NOT CLEAR BY WRITING THE PDR
    (1)                                                                  ;FOR TIGHTER SCOPE LOOP
    (1)                                                                  ;REPLACE ERROR CALL WITH
    (1)                                                                  ;'BR 3$'' = 000740
    (1)  025564  062705  000002            8$:   ADD     #2,R5           ;POINT R5 TO THE NEXT PDR TO BE TESTED
    (1)  025570  062703  020000                  ADD     #20000,R3       ;CHANGE VIRT. ADDR TO REF. NEXT PDR
    (1)  025574  077445                          SOB     R4,3$           ;LOOP BACK TO 3$ UNTIL ALL 8 PDR'S TESTED
    (1)  025576  012737  025410  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
    (1)  025604  004737  035134                  JSR     PC,TON          ;TURN T-BIT BACK ON FOR NEXT TEST
1467     025610  005037  177776                  CLR     PSW             ;BACK TO KERNEL MODE BEFORE LEAVING
1468
1478                                     ;;*****************************************************************
    (3)                                  ;*TEST 30       TEST 'W-BIT'' SPECIAL CASES
    (4)                                  ;*
    (4)                                  ;*      THIS TEST CHECKS TWO SPECIAL CASES OF THE W-BIT. FIRST CASE IS
    (4)                                  ;*      THAT THE W-BIT SHOULD NOT SET IN PDR 7 WHEN WRITING TO
    (4)                                  ;*      STATUS REG SR0 (KERNEL PDR 7 IS USED).  SECOND CASE IS THAT
    (4)                                  ;*      THE W-BIT IS STILL SET IF THE 'DATO'' IS ABORTED DUE TO A
    (4)                                  ;*      TIMEOUT ERROR (KERNEL PDR6 & VIRTUAL ADDR 140000 ARE USED).
    (4)                                  ;*
    (3)                                  ;;*****************************************************************
    (2)  025614  000004                  TST30:  SCOPE
1479
1480     025616  004737  035100            1$:   JSR     PC,TOFF         ;TURN OFF T-BIT TRAPPING FOR THIS TEST
1481     025622  012701  077406                  MOV     #77406,R1       ;PUT 'W-BIT OFF'' VALUE FOR PDR IN R1
1482     025626  012737  025634  001 10          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
1483
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 1484  025634  010137  172316          2$:     MOV     R1,KIPDR7       ;LOAD KERNEL PDR 7 TO CLEAR W-BIT
 1485  025640  013700  177572                  MOV     SR0,R0          ;READ PRESENT CONTENTS OF STATUS REG. 0
 1486  025644  010037  177572                  MOV     R0,SR0          ;WRITE PRESENT CONTENTS OF SR0 BACK TO ITSELF
 1487  025650  013702  172316                  MOV     KIPDR7,R2       ;READ CONTENTS OF KIPDR7 INTO R2
 1488  025654  020102                          CMP     R1,R2           ;WAS W-BIT LEFT CLEARED?
 1489  025656  001401                          BEQ     3$              ;BRANCH IF YES
 1490  025660  104024                          ERROR   24              ;W-BIT IN KIPDR7 SET WHEN SR0 WAS WRITTEN TO
 1491                                                                  ;FOR TIGHTER SCOPE LOOP
 1492                                                                  ;REPLACE ERROR CALL WITH
 1493                                                                  ;"BR 2$" = 000765
 1494  025662  012737  025662  001110  3$:     MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
 1495  025670  010137  172314                  MOV     R1,KIPDR6       ;LOAD KERNEL PDR6 WITH 77406 TO CLEAR W-BIT
 1496  025674  012737  025706  000004          MOV     #4$,ERRVEC      ;SET UP LOC. 4 TO 4$ FOR ODD ADDR. ABORT
 1497  025702  005037  140000                  CLR     @#140000        ;CAUSE TIMEOUT ABORT THRU LOC. 4
 1498  025706  012706  001100          4$:     MOV     #KERSTK,KSP     ;RESTORE THE STACK POINTER
 1499  025712  013702  172314                  MOV     KIPDR6,R2       ;READ KIPDR6 INTO R2
 1500  025716  052701  000100                  BIS     #100,R1         ;R1-77506
 1501  025722  020102                          CMP     R1,R2           ;WAS W-BIT SET?
 1502  025724  001401                          BEQ     5$              ;BRANCH IF YES
 1503  025726  104025                          ERROR   25              ;W-BIT WAS NOT SET DURING A TIMEOUT ABORT
 1504                                                                  ;FOR TIGHTER SCOPE LOOP
 1505                                                                  ;REPLACE ERROR CALL WITH
 1506                                                                  ;"BR 3$" = 000757
 1507  025730  010137  172314          5$:     MOV     R1,KIPDR6       ;RESTORE KIPDR6 TO 77406
 1508  025734  012737  001400  172354          MOV     #1400,KIPAR6    ;RESTORE KIPAR6 TO 1400
 1509  025742  012737  002076  000004          MOV     #TIMERR,ERRVEC  ;PESTORE NORMAL CPU TRAP ROUTINE TO LOC.4
 1510  025750  012737  025616  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
 1511  025756  004737  035134                  JSR     PC,TON          ;TURN T-BIT TRAPPING BACK ON
 1512
 1513                                  ;;*****************************************************************
 1514                                  ;*
 1515                                  ;*      THE NEXT THREE (3) TESTS CAUSE MEMORY MANAGEMENT ERRORS
 1516                                  ;*      TO CHECK THE ABILITY OF STATUS REGISTER 0 TO RECORD KT
 1517                                  ;*      ERRORS AND THE ABILITY OF STATUS REGISTER 2 TO LOCK UP THE
 1518                                  ;*      VIRTUAL ADDR. OF THE INSTRUCTION THAT CAUSED THE ERROR.
 1519                                  ;*      THE BITS OF SR2 ARE CHECKED AND BITS <15:13>, <6:5>, AND <3:0>
 1520                                  ;*      ARE CHECKED IN SR0.  SO THE SR0 AND SR2 LOGIC AND THE
 1521                                  ;*      KT ERROR LOGIC ARE CHECKED.
 1522                                  ;*
 1523                                  ;;*****************************************************************
 1524
 1533                                  ;;*****************************************************************
  (3)                                 ;*TEST 31       NON-RESIDENT ABORT TEST (ACF=0&4)
  (4)                                 ;*
  (4)                                 ;*      THIS TEST CHECKS THE ACCESS CONTROL FIELD (ACF) COMPARATOR
  (4)                                 ;*      LOGIC BY CAUSING NON-RESIDENT ABORTS IN BOTH KERNEL AND
  (4)                                 ;*      USER MODES.  PDR 4 IS LOADED WITH ACF'S = 0&4 AND
  (4)                                 ;*      THEN PHYSICAL ADDR. 60000 IS ACCESSED TO CAUSE THE ABORT.
  (4)                                 ;*
  (3)                                 ;;*****************************************************************
  (2)  025762  000004                 TST31:  SCOPE
 1534
 1535  025764  012700  000600          1$:     MOV     #600,R0         ;LOAD DATA FOR PAR'S INTO R0
 1536  025770  010037  172346                  MOV     R0,KIPAR3       ;MAP KERNEL PAR'S 3&4 TO 12-16K
 1537  025774  010037  172350                  MOV     R0,KIPAR4
 1538  026000  010037  177646                  MOV     R0,UIPAR3       ;MAP USER PAR'S 3&4 TO 12-16K
```

```
1539  026004  010037  177650                  MOV     R0,UIPAR4
1540  026010  012737  077406  172306          MOV     #77406,KIPDR3   ;MAP KERNEL PDR 3  128 BLKS, READ-WRITE
1541  026016  012737  077406  177606          MOV     #77406,UIPDR3   ;MAP USER PDR 3  128 BLKS, READ-WRITE
1542  026024  012700  060000                  MOV     #60000,R0       ;LOAD VIRTUAL ADDR. TO REFERENCE PDR3 INTO R0
1543  026030  012701  100000                  MOV     #100000,R1      ;LOAD VIRTUAL ADDR. TO REFERENCE PDR4 INTO R1
1544  026034  012703  100011                  MOV     #100011,R3      ;LOAD R3 WITH WHAT SR0 SHOULD READ - N.R., KERNEL, PG.4
1545  026040  012702  077400                  MOV     #77400,R2       ;LOAD ACF=0 (NON-RESIDENT) PDR VALUE IN R2
1546  026044  012737  026106  000250  2$:     MOV     #5$,MMVEC       ;POINT MEM. MGMT. TRAP VECTOR TO 5$ BELOW
1547  026052  010237  172310                  MOV     R2,KIPDR4       ;LOAD ACF TEST VALUE INTO KIPDR4
1548  026056  010237  177610                  MOV     R2,UIPDR4       ;LOAD ACF TEST VALUE INTO UIPDR4
1549  026062  012737  026070  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
1550  026070  005010                  3$:     CLR     (R0)            ;CLEAR PHYS. LOC. 60000 USING PDR3
1551  026072  013737  177776  001176          MOV     PSW,$TMP0       ;SAVE PSW IN CASE OF ERROR
1552  026100  005211                  4$:     INC     (R1)            ;TRY TO REF. IT USING PDR4 - SHOULD TRAP TO 5$
1553  026102  104026                          ERROR   26              ;MEM. MGMT. ABORT DID NOT OCCUR
1554                                                                  ;FOR TIGHTER SCOPE LOOP
1555                                                                  ;REPLACE ERROR CALL WITH
1556                                                                  ;'BR 3$'' = 000772
1557  026104  000425                          BR      8$              ;BRANCH AROUND STATUS REG. CHECKS IF NO ABORT
1558  026106  062706  000004          5$:     ADD     #4,SP           ;RESTORE STACK POINTER
1559  026112  005710                          TST     (R0)            ;DID INSTRUCTION GET ABORTED & NOT EXECUTE
1560  026114  001401                          BEQ     6$              ;BRANCH IF YES
1561  026116  104027                          ERROR   27              ;INSTRUCTION WAS NOT ABORTED, LOC. GOT CHANGED
1562                                                                  ;FOR TIGHTER SCOPE LOOP
1563                                                                  ;REPLACE ERROR CALL WITH
1564                                                                  ;'BR 3$'' = 000764
1565  026120  013737  177572  001272  6$:     MOV     SR0,WASSR0      ;READ STATUS REGISTER 0
1566  026126  013737  177576  001274          MOV     SR2,WASSR2      ;READ STATUS REGISTER 2
1567  026134  020337  001272                  CMP     R3,WASSR0       ;DID SR0 REPORT NON-RESIDENT ERROR CORRECTLY?
1568  026140  001401                          BEQ     7$              ;BRANCH IF YES
1569  026142  104030                          ERROR   30              ;SR0 DID NOT REPORT NON-RES. ERROR CORRECTLY
1570                                                                  ;FOR TIGHTER SCOPE LOOP
1571                                                                  ;REPLACE ERROR CALL WITH
1572                                                                  ;'BR 3$'' = 000752
1573  026144  012704  026100          7$:     MOV     #4$,R4          ;LOAD R4 WITH WHAT SR2 SHOULD READ
1574  026150  020437  001274                  CMP     R4,WASSR2       ;DID SR2 LOCKUP RIGHT VIRTUAL ADDR. (=4$)?
1575  026154  001401                          BEQ     8$              ;BRANCH IF YES
1576  026156  104031                          ERROR   31              ;SR2 DID NOT LOCK VIRTUAL ADDR. OF NON-RES. ERROR
1577                                                                  ;FOR TIGHTER SCOPE LOOP
1578                                                                  ;REPLACE ERROR CALL WITH
1579                                                                  ;'BR 3$'' = 000744
1580  026160  042737  160000  177572  8$:     BIC     #160000,SR0     ;CLEAR THE ERROR BITS IN SR0
1581  026166  032737  140000  001176          BIT     #140000,$TMP0   ;HAS ACF=0&4 BEEN TESTED IN USER YET
1582  026174  001006                          BNE     9$              ;BRANCH IF YES
1583  026176  012703  100151                  MOV     #100151,R3      ;LOAD R3 WITH WHAT SR0 SHOULD READ - N.R., USER, PG.4
1584  026202  012737  140000  177776          MOV     #140000,PSW     ;GO TO USER MODE
1585  026210  000715                          BR      2$              ;REPEAT TEST IN USER MODE
1586  026212  022702  077404          9$:     CMP     #77404,R2       ;HAS ACF=4 BEEN TESTED YET?
1587  026216  001407                          BEQ     10$             ;BRANCH IF YES
1588  026220  012702  077404                  MOV     #77404,R2       ;THEN LOAD ACF=4 (NON-RES) PDR VALUE IN R2
1589  026224  012703  100011                  MOV     #100011,R3      ;LOAD R3 WITH WHAT SR0 SHOULD READ-N.R.,KERNEL,PG. 4
1590  026230  005037  177776                  CLR     PSW             ;GO BACK TO KERNEL MODE
1591  026234  000703                          BR      2$              ;GO BACK & TEST ACF=4 IN SAME MODE
1592  026236  005037  177776          10$:    CLR     PSW             ;GO BACK TO KERNEL MODE BEFORE LEAVING
1593  026242  012737  025764  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1594  026250  012737  002150  000250          MOV     #MGMERR,MMVEC   ;RESTORE ADDRESS OF NORMAL MEMORY
```

```
                                                        ;MANAGEMENT ERROR ROUTINE TO MMVEC

                                        ;;*****************************************************************
                                        ;*TEST 32       READ-ONLY ABORT TEST (ACF=2)
                                        ;*
                                        ;*      THIS TEST CHECKS THE ACCESS CONTROL FIELD (ACF) COMPARATOR
                                        ;*      LOGIC BY CAUSING READ-ONLY ABORTS IN BOTH KERNEL AND
                                        ;*      USER MODES.  PDR 4 IS LOAD WITH ACF=2 AND THEN
                                        ;*      PHYSICAL ADDR. 60000 IS WRITTEN TO CAUSE THE ABORT.
                                        ;*
                                        ;;*****************************************************************
026256  000004                  TST32:  SCOPE
026260                          1$:                             ;KERNEL & USER PAR'S 3 & 4 AND PDR 3
                                                                ;ARE SETUP FROM LAST TEST
026260  012700  060000                  MOV     #60000,R0       ;LOAD VIRTUAL ADDR. TO REFERENCE PDR3 INTO R0
026264  012701  100000                  MOV     #100000,R1      ;LOAD VIRTUAL ADDR. TO REFERENCE PDR4 INTO R1
026270  012703  020011                  MOV     #20011,R3       ;LOAD R3 WITH WHAT SR0 SHOULD READ - R/O, KERNEL, PG.4
026274  012702  077402                  MOV     #77402,R2       ;LOAD ACF=2 (READ-ONLY) PDR VALUE IN R2
026300  012737  026342  000250  2$:     MOV     #5$,MMVEC       ;POINT MEM. MGMT. TRAP VECTOR TO 5$ BELOW
026306  010237  172310                  MOV     R2,KIPDR4       ;LOAD ACF=2 INTO KIPDR4
026312  010237  177610                  MOV     R2,UIPDR4       ;LOAD ACF=2 INTO UIPDR4
026316  012737  026324  001110          MOV     #3$,$LPERR      ;SET LOOP ON ERROR POINTER TO 3$
026324  005010                  3$:     CLR     (R0)            ;CLEAR PHYS. LOC. 60000 USING PDR3
026326  013737  177776  001176          MOV     PSW,$TMP0       ;SAVE PSW IN CASE OF ERROR
026334  005211                  4$:     INC     (R1)            ;TRY TO WRITE USING PDR4 - SHOULD TRAP TO 5$
026336  104026                          ERROR   26              ;MEM. MGMT. ABORT DID NOT OCCUR
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;'BR 3$'' = 000772
026340  000425                          BR      8$              ;BRANCH AROUND STATUS REG. CHECKS IF NO ABORT
026342  062706  000004          5$:     ADD     #4,SP           ;RESTORE STACK POINTER
026346  005710                          TST     (R0)            ;DID INSTRUCTION GET ABORTED & NOT EXECUTE
026350  001401                          BEQ     6$              ;BRANCH IF YES
026352  104027                          ERROR   27              ;INSTRUCTION WAS NOT ABORTED, LOC. GOT CHANGED
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;'BR 3$'' = 000764
026354  013737  177572  001272  6$:     MOV     SR0,WASSR0      ;READ STATUS REG. 0
026362  013737  177576  001274          MOV     SR2,WASSR2      ;READ STATUS REG. 2
026370  020337  001272                  CMP     R3,WASSR0       ;DID SR0 REPORT READ-ONLY ERROR CORRECTLY?
026374  001401                          BEQ     7$              ;BRANCH IF YES
026376  104030                          ERROR   30              ;SR0 DID NOT REPORT R/O ERROR CORRECTLY
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;'BR 3$'' = 000752
026400  012704  026334          7$:     MOV     #4$,R4          ;LOAD R4 WITH WHAT SR2 SHOULD READ
026404  020437  001274                  CMP     R4,WASSR2       ;DID SR2 LOCKUP RIGHT VIRTUAL ADDR. (=4$)?
026410  001401                          BEQ     8$              ;BRANCH IF YES
026412  104031                          ERROR   31              ;SR2 DID NOT LOCKUP VIRTUAL ADDR. OF R/O ERROR
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;'BR 3$'' = 000744
026414  042737  160000  177572  8$:     BIC     #160000,SR0     ;CLEAR THE ERROR BITS IN SR0
026422  032737  140000  001176          BIT     #140000,$TMP0   ;HAS ACF=2 BEEN TESTED IN USER MODE?
026430  001006                          BNE     9$              ;BRANCH IF YES
026432  012703  020151                  MOV     #20151,R3       ;LOAD R3 WITH WHAT SR0 SHOULD READ-R/O, USER, PG.4
```

```
1650  026436  012737  140000  177776          MOV     #140000,PSW     ;GO TO USER MODE
1651  026444  000715                          BR      2$              ;REPEAT TEST IN USER MODE
1652  026446  005037  177776          9$:     CLR     PSW             ;GO BACK TO KERNEL MODE BEFORE LEAVING
1653  026452  012737  026260  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1654  026460  012737  002150  000250          MOV     #MGMERR,MMVEC   ;RESTORE ADDRESS OF NORMAL MEMORY
1655                                                                  ;MANAGEMENT ERROR ROUTINE TO MMVEC.
1656
1657
1658
1659
1660
1661
1662
1663
1664
1665
1666
1667                                  ;;*****************************************************************
1668                                  ;*
1669                                  ;*      THE NEXT TWO (2) TESTS WILL BE CHECKING THE PAGE LENGTH
1670                                  ;*      COMPARATORS AND SOME MORE OF THE KT ERROR DETECTION
1671                                  ;*      AND STATUS LOGIC.  THE PAGE LENGTH FIELD (PLF) IN KERNEL
1672                                  ;*      PDR 4 IS VARIED AND FOR EVERY PLF, THREE (3) VIRTUAL
1673                                  ;*      ADDRESSES ARE READ.  WHILE USING BOTH UPWARD & DOWNWARD PAGE
1674                                  ;*      EXPANSION, ONE OF THOSE THREE VIRTUAL ADDRESSES WILL CAUSE A
1675                                  ;*      "PAGE LENGTH ABORT" WHILE THE OTHER TWO WON'T.
1676                                  ;*
1677                                  ;*      STATUS REGISTER 0 & 2 ARE CHECKED WHEN THE PAGE LENGTH
1678                                  ;*      ABORT DOES OCCUR TO SEE THAT THE ABORT IS REPORTED AND THAT
1679                                  ;*      THE VIRTUAL ADDRESS OF THE INSTRUCTION THAT CAUSED THE ABORT
1680                                  ;*      IS LOCKED UP.
1681                                  ;*
1682                                  ;*****************************************************************
1683
1684
1696
1697                                  ;;*****************************************************************
 (3)                                  ;*TEST 33       PAGE LENGTH FAULTS-UPWARD EXPANSION
 (4)                                  ;*
 (4)                                  ;*      THIS TEST VARIES THE PAGE LENGTH FIELD (PLF) IN KERNEL PDR 4
 (4)                                  ;*      FROM 1 TO 177 AND FOR EACH PLF, THREE VIRTUAL ADDRESSES (VBA'S)
 (4)                                  ;*      ARE ACCESSED.  WHEN VBA <12:6> IS LESS THAN OR EQUAL TO PDR <14:8>
 (4)                                  ;*      NO ABORT SHOULD OCCUR.  WHEN VBA <12:6> IS GREATER THAN PDR <14:8>,
 (4)                                  ;*      A PAGE LENGTH ABORT SHOULD OCCUR AND BE REPORTED BY SR0 & SR2.
 (4)                                  ;*      THE PAGE EXPANSION DIRECTION IN THIS TEST IS UPWARD, (THE ED BIT
 (4)                                  ;*      (BIT 3) OF PDR 4 = 0).
 (4)                                  ;*
 (3)                                  ;*****************************************************************
 (2)  026466  000004                  TST33:  SCOPE
1698  026470  012737  077406  172306  1$:     MOV     #77406,KIPDR3   ;MAKE SURE PDR3 IS DESCRIBED AS R/W
1699  026476  012737  077406  172312          MOV     #77406,KIPDR5   ;MAKE SURE PDR5 IS DESCRIBED AS R/W
1700  026504  012700  026764                  MOV     #DALTB1,R0      ;DAL TABLE FOR VIRTUAL ADDR'S. TO SELECT PDR4.
1701  026510  012704  027002                  MOV     #PDRTB1,R4      ;PDR TABLE FOR PDR4 (COINCIDES WITH DAL TABLE).
1702  026514  012701  000006                  MOV     #6,R1           ;SET UP LOOP COUNTER.
1703  026520  012737  026676  000250          MOV     #9$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR UNEXPECTED ABORTS
1704  026526  012737  026540  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
```

```
1705  026534  012706  001100            MOV     #KERSTK,KSP     ;MAKE SURE STACK POINTER IS ALL SET UP
1706
1707                                    ;TEST NON-ABORT CASES (VBA < OR = PLF)
1708  026540  012437  172310        2$: MOV     (R4)+,KIPDR4    ;LOAD KIPDR4 WITH PAGE LENGTH VALUE
1709  026544  005730                    TST     @(R0)+          ;ACCESS VIRTUAL ADDR. (VBA < OR = PLF)
1710                                                            ;NO ABORT SHOULD OCCUR!!!
1711  026546  077104                    SOB     R1,2$           ;DONE?...NO- TEST NEXT COMBINATION OF DAL & PDR.
1712
1713                                    ;TEST ABORT CASES (VBA > PLF)
1714  026550  012701  000005        3$: MOV     #5,R1           ;SET UP LOOP COUNTER.
1715  026554  012700  027020            MOV     #DALTB2,R0      ;DAL TABLE
1716  026560  012704  027034            MOV     #PDRTB2,R4      ;PDR TABLE
1717  026564  012737  026600  001110    MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
1718  026572  012737  026612  000250    MOV     #6$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR EXPECTED ABORT
1719
1720  026600  012437  172310        4$: MOV     (R4)+,KIPDR4    ;LOAD KIPDR4 WITH PAGE LENGHT VALUE
1721  026604  005730                5$: TST     @(R0)+          ;ACCESS VIRTUAL ADDR. (VBA > PLF - ABORT TO 6$)
1722  026606  104033                    ERROR   33              ;EXPECTED PAGE LENGTH ABORT DID NOT OCCUR
1723                                                            ;FOR TIGHTER SCOPE LOOP
1724                                                            ;REPLACE ERROR CALL WITH
1725                                                            ;'BR 5$'' = 000776
1726  026610  000424                    BR      8$              ;BRANCH AROUND ABORT CHECKS
1727  026612  012706  001100        6$: MOV     #KERSTK,KSP     ;RESTORE STACK POINTER FOLLOWING ABORT
1728  026616  013737  177572  001272    MOV     SR0,WASSR0      ;READ M.M. STATUS REG. 0
1729  026624  013737  177576  001274    MOV     SR2,WASSR2      ;READ M.M. STATUS REG. 2
1730  026632  012702  040011            MOV     #40011,R2       ;PUT EXPECTED SR0 CONTENTS IN R2
1731  026636  020237  001272            CMP     R2,WASSR0       ;DID SR0 REPORT PG. LENGTH ABORT, PAGE 4, KERNEL?
1732  026642  001401                    BEQ     7$              ;BRANCH IF YES
1733  026644  104034                    ERROR   34              ;SR0 DID NOT REPORT PG. LENGTH ABORT CORRECTLY
1734                                                            ;FOR TIGHTER SCOPE LOOP
1735                                                            ;REPLACE ERROR CALL WITH
1736                                                            ;'BR 5$'' = 000757
1737  026646  012703  026604        7$: MOV     #5$,R3          ;PUT EXPECTED SR2 CONTENTS IN R3
1738  026652  020337  001274            CMP     R3,WASSR2       ;DID SR2 LOCKUP VIRT. ADDR. OF ABORTED INSTRUCTION?
1739  026656  001401                    BEQ     8$              ;BRANCH IF YES
1740  026660  104035                    ERROR   35              ;SR2 DID NOT LOCKUP VIRT. ADDR. OF ABORT CORRECTLY
1741                                                            ;FOR TIGHTER SCOPE LOOP
1742                                                            ;REPLACE ERROR CALL WITH
1743                                                            ;'BR 5$'' = 000751
1744  026662  042737  160000  177572  8$: BIC     #160C00,SR0     ;CLEAR ERROR BITS IN SR0
1745  026670  077135                    SOB     R1,4$           ;DONE?..NO - GET NEXT DAL & PDR PAIR
1746  026672  000137  026744            JMP     10$             ;YES...
1747  026676  012637  001266        9$: MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
1748  026702  012637  001270            MOV     (KSP)+,TRAPPS
1749  026706  013737  177572  001272    MOV     SR0,WASSR0      ;SAVE CONTENTS OF SR0 FOR ERROR
1750  026714  013737  177576  001274    MOV     SR2,WASSR2      ;SAVE CONTENTS OF SR2 FOR ERROR
1751  026722  042737  160000  177572    BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
1752  026730  104032                    ERROR   32              ;GOT PG. LENGTH ABORT BEFORE IT WAS EXPECTED
175?                                                            ;FOR TIGHTER SCOPE LOOP
175                                                             ;REPLACE ERROR CALL WITH
1755                                                            ;A 'NOP'' = 000240
1756  026732  013746  001270            MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
1757  026736  013746  001266            MOV     TRAPPC,-(KSP)
1758  026742  000002                    RTI                     ;RETURN FROM UNEXPECTED ABORT
1759
1760  026744  012737  026470  001110 10$: MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
```

```
1761  026752  012737  002150  000250          MOV     #MMGMERR,MMVEC   ;RESTORE NORMAL M.M. TRAP HANDLER
1762                                                                   ;ADDRESS TO M.M. TRAP VECTOR
1763  026760  000137  027050                  JMP     TST34
1764
1765                                  ;DAL TABLE FOR UPWARD EXPANSION (NON-ABORT CASES)
1766  026764  100000                  DALTB1: 100000
1767  026766  106100                          106100
1768  026770  102300                          102300
1769  026772  102500                          102500
1770  026774  113700                          113700
1771  026776  104600                          104600
1772  027000  117700                          117700
1773
1774                                  ;PDR TABLE FOR KPDR4 (NON-ABORT CASES)
1775  027002  000006                  PDRTB1: 000006
1776  027004  052006                          052006
1777  027006  045006                          045006
1778  027010  052006                          052006
1779  027012  074406                          074406
1780  027014  025006                          025006
1781  027016  077406                          077406
1782
1783                                  ;DAL TABLE (ABORT CASES)
1784  027020  100100                  DALTB2: 100100
1785  027022  110100                          110100
1786  027024  116600                          116600
1787  027026  112700                          112700
1788  027030  117000                          117000
1789  027032  117700                          117700
1790
1791                                  ;PDR TABLE (ABORT CASES)
1792  027034  000006                  PDRTB2: 000006
1793  027036  030406                          030406
1794  027040  046406                          046406
1795  027042  042006                          042006
1796  027044  073406                          073406
1797  027046  077006                          077006
1798
1810
1811                                  ;;*****************************************************************
 (3)                                  ;*TEST 34        PAGE LENGTH FAULTS-DOWNWARD EXPANSION
 (4)                                  ;*
 (4)                                  ;*      THIS TEST VARIES THE PAGE LENGTH FIELD (PLF) IN KERNEL PDR4
 (4)                                  ;*      FROM 176 TO 0 AND FOR EACH PLF, THREE VIRTUAL ADDRESSES (VBA'S)
 (4)                                  ;*      ARE ACCESSED.  WHEN VBA <12:6> IS GREATER THAN OR EQUAL TO PDR <14:8>
 (4)                                  ;*      NO PAGE ABORT SHOULD OCCUR.  WHEN VBA <12:6> IS LESS THAN PDR <14:8>
 (4)                                  ;*      A PAGE LENGTH ABORT SHOULD OCCUR AND BE REPORTED BY SR0 & SR2.
 (4)                                  ;*      THE PAGE EXPANSION DIRECTION IN THIS TEST IS DOWNWARD, (THE ED BIT
 (4)                                  ;*      (BIT 3) OF PDR4-1).
 (4)                                  ;*
 (3)                                  ;;*****************************************************************
 (2)  027050  000004                  TST34:  SCOPE
1812  027052  012700  027332          1$:     MOV     #DALTB3,R0      ;DAL TABLE FOR VIRTUAL ADDR'S. TO SELECT PDR4.
1813  027056  012704  027350                  MOV     #PDRTB3,R4      ;PDR TABLE FOR PDR4 (COINCIDES WITH DAL TABLE).
1814  027062  012701  000006                  MOV     #6,R1           ;SET UP LOOP COUNTER.
1815  027066  012737  027244  000250          MOV     #9$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR UNEXPECTED ABORTS
```

```
1816  027074  012737  027106  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
1817  027102  012706  001100                  MOV     #KERSTK,KSP     ;MAKE SURE STACK POINTER IS ALL SET UP
1818
1819                                  ;TEST NON-ABORT CASES (VBA > OR = PLF)
1820  027106  012437  172310          2$:     MOV     (R4)+,KIPDR4    ;LOAD KIPDR4 WITH PAGE LENCTH VALUE
1821  027112  005730                          TST     @(R0)+          ;ACCESS VIRTUAL ADDR. (VBA > OR = PLF)
1822                                                                  ;NO ABORT SHOULD OCCUR!!!
1823  027114  077104                          SOB     R1,2$           ;DONE?...NO- TEST NEXT COMBINATION OF DAL & PDR.
1824
1825                                  ;TEST ABORT CASES (VBA < PLF)
1826  027116  012701  000005          3$:     MOV     #5,R1           ;SET UP LOOP COUNTER.
1827  027122  012700  027366                  MOV     #DALTB4,R0      ;DAL TABLE
1828  027126  012704  027402                  MOV     #PDRTB4,R4      ;PDR TABLE
1829  027132  012737  027146  001110          MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
1830  027140  012737  027160  00025C          MOV     #6$,MMVEC       ;SETUP M.M. TRAP VECTOR FOR EXPECTED ABORT
1831
1832  027146  012437  172310          4$:     MOV     (R4)+,KIPDR4    ;LOAD KIPDR4 WITH PAGE LENGHT VALUE
1833  027152  005730                  5$:     TST     @(R0)+          ;ACCESS VIRTUAL ADDR. (VBA < PLF - ABORT TO 6$)
1834  027154  104033                          ERROR   33              ;EXPECTED PAGE LENGTH ABORT DID NOT OCCUR
1835                                                                  ;FOR TIGHTER SCOPE LOOP
1836                                                                  ;REPLACE ERROR CALL WITH
1837                                                                  ;'BR 5$' = 000776
1838  027156  000424                          BR      8$              ;BRANCH AROUND ABORT CHECKS
1839  027160  012706  001100          6$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER FOLLOWING ABORT
1840  027164  013737  177572  001272          MOV     SR0,WASSR0      ;READ M.M. STATUS REG. 0
1841  027172  013737  177576  001274          MOV     SR2,WASSR2      ;READ M.M. STATUS REG. 2
1842  027200  012702  040011                  MOV     #40011,R2       ;PUT EXPECTED SR0 CONTENTS IN R2
1843  027204  020237  001272                  CMP     R2,WASSR0       ;DID SR0 REPORT PG. LENGTH ABORT, PAGE 4, KERNEL?
1844  027210  001401                          BEQ     7$              ;BRANCH IF YES
1845  027212  104034                          ERROR   34              ;SR0 DID NOT REPORT PG. LENGTH ABORT CORRECTLY
1846                                                                  ;FOR TIGHTER SCOPE LOOP
1847                                                                  ;REPLACE ERROR CALL WITH
1848                                                                  ;'BR 5$' = 000757
1849  027214  012703  027152          7$:     MOV     #5$,R3          ;PUT EXPECTED SR2 CONTENTS IN R3
1850  027220  020337  001274                  CMP     R3,WASSR2       ;DID SR2 LOCKUP VIRT. ADDR. OF ABORTED INSTRUCTION?
1851  027224  001401                          BEQ     8$              ;BRANCH IF YES
1852  027226  104035                          ERROR   35              ;SR2 DID NOT LOCKUP VIRT. ADDR. OF ABORT CORRECTLY
1853                                                                  ;FOR TIGHTER SCOPE LOOP
1854                                                                  ;REPLACE ERROR CALL WITH
1855                                                                  ;'BR 5$' = 000751
1856  027230  042737  160000  177572  8$:     BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
1857  027236  077135                          SOB     R1,4$           ;DONE?..NO - GET NEXT DAL & PDR PAIR
1858  027240  000137  027312                  JMP     10$             ;YES...
1859  027244  012637  001266          9$:     MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
1860  027250  012637  001270                  MOV     (KSP)+,TRAPPS
1861  027254  013737  177572  001272          MOV     SR0,WASSR0      ;SAVE CONTENTS OF SR0 FOR ERROR
1862  027262  013737  177576  001274          MOV     SR2,WASSR2      ;SAVE CONTENTS OF SR2 FOR ERROR
1863  027270  042737  160000  177572          BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
1864  027276  104032                          ERROR   32              ;GOT PG. LENGTH ABORT BEFORE IT WAS EXPECTED
1865                                                                  ;FOR TIGHTER SCOPE LOOP
1866                                                                  ;REPLACE ERROR CALL WITH
1867                                                                  ;A 'NOP' = 000240
1868  027300  013746  001270                  MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
1869  027304  013746  001266                  MOV     TRAPPC,-(KSP)
1870  027310  000002                          RTI                     ;RETURN FROM UNEXPECTED ABORT
1871
```

```
1872  027312  012737  027052  001110  10$:    MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
1873  027320  012737  002150  000250          MOV     #MGMERR,MMVEC   ;RESTORE NORMAL M.M. TRAP HANDLER
1874                                                                  ;ADDRESS TO M.M. TRAP VECTOR
1875  027326  000137  027416                  JMP     TST35
1876
1877                                  ;DAL TABLE FOR DOWNWARD EXPANSION (NON-ABORT CASES)
1878  027332  117700                  DALTB3: 117700
1879  027334  111600                          111600
1880  027336  115400                          115400
1881  027340  115200                          115200
1882  027342  104000                          104000
1883  027344  113100                          113100
1884  027346  100000                          100000
1885
1886                                  ;PDR TABLE (NON-ABORT CASES)
1887  027350  077416                  PDRTB3: 77416
1888  027352  025416                          25416
1889  027354  032416                          32416
1890  027356  025416                          25416
1891  027360  003016                          03016
1892  027362  052416                          52416
1893  027364  000016                          00016
1894
1895                                  ;DAL TABLE (ABORT CASES)
1896  027366  117600                  DALTB4: 117600
1897  027370  107600                          107600
1898  027372  101100                          101100
1899  027374  105000                          105000
1900  027376  100700                          100700
1901  027400  100000                          100000
1902
1903                                  ;PDR TABLE (ABORT CASES)
1904  027402  077416                  PDRTB4: 77416
1905  027404  047016                          47016
1906  027406  031016                          31016
1907  027410  035416                          35416
1908  027412  004016                          04016
1909  027414  000416                          00416
1910
1911
1925
1926                                  ;;*****************************************************************
 (3)                                  ;*TEST 35       SR2 BIT TEST
 (4)                                  ;*
 (4)                                  ;*      THIS TEST CHECKS THE BITS IN MEMORY MANAGEMENT REGISTER 2 BY
 (4)                                  ;*      CAUSING 'READ-ONLY ABORTS'' AT VIRTUAL ADDRESSES BETWEEN 100000
 (4)                                  ;*      TO 110000 (PHYSICAL ADDRESSES 060000-070000).  KIPDR4 IS USED TO EXECUTE
 (4)                                  ;*      THE FOLLOWING FOUR WORDS OF CODE WHICH ARE MOVED THRU MEMORY:
 (4)                                  ;*      010727  MOV     PC,(PC)+  ;THIS INSTRUCTION SHOULD CAUSE A R/O ABORT
 (4)                                  ;*      000000                    ;ITS VIRTUAL ADDR. SHOULD BE LOCKED UP IN SR2
 (4)                                  ;*      000137  JMP     @#3$      ;THIS INSTRUCTION IS ALSO MOVED THRU MEMORY
 (4)                                  ;*      (ADDR. OF 3$)             ;IN CASE A R/O ABORT DOES NOT OCCUR,
 (4)                                  ;*                                ;IN WHICH CASE SR2 WILL NOT CONTAIN CORRECT ADDR.
 (4)                                  ;*
 (3)                                  ;;*****************************************************************
 (2)  027416  000004                  TST35:  SCOPE
```

```
 1927  027420  012737  000600  172346  1$:     MOV     #600,KIPAR3     ;BE SURE PAR3 IS MAPPED TO 12-16K
 1928  027426  012737  000600  172350          MOV     #600,KIPAR4     ;BE SURE PAR4 IS MAPPED TO 12-16K
 1929  027434  012737  077406  172306          MOV     #77406,KIPDR3   ;MAP PAGE 3  128 BLOCKS, R/W
 1930  027442  012737  077402  172310          MOV     #77402,KIPDR4   ;MAP PAGE 4  128 BLOCKS, READ-ONLY
 1931  027450  012700  060002                  MOV     #60002,R0       ;LOAD R0 WITH VIRTUAL ADDR. WHICH USES PDR3
 1932  027454  012701  100002                  MOV     #100002,R1      ;LOAD R1 WITH VIRTUAL ADDR. WHICH USES PDR4
 1933  027460  012737  027514  000250          MOV     #3$,MMVEC       ;SET M.M. TRAP VECTOR TO 3$
 1934  027466  012737  027474  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
 1935  027474  012720  010727          2$:     MOV     #010727,(R0)+   ;LOAD 'MOV PC,(PC)+'' INSTRUCTION AT ADDR.
 1936  027500  005020                          CLR     (R0)+           ;       REACHED THRU PDR/PAR 4.
 1937  027502  012720  000137                  MOV     #000137,(R0)+   ;LOAD ''JMP @#3$'' INSTRUCTION AT VIRT. ADDR.
 1938  027506  012710  027514                  MOV     #3$,(R0)        ;       IN CASE R/O VIOL. DOES NOT ABORT
 1939  027512  010107                          MOV     R1,PC           ;TRANSFER PROGRAM EXECUTION TO 'PAGE 4 INSTRUCTIONS''
 1940  027514  012706  001100          3$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER
 1941  027520  013737  177576  001274          MOV     SR2,WASSR2      ;READ CONTENTS OF STATUS REG 2
 1942  027526  020137  001274                  CMP     R1,WASSR2       ;WAS ADDR. OF 'RELOCATED - R/O ABORT'' LOCKED UP?
 1943  027532  001401                          BEQ     4$              ;BRANCH IF YES
 1944  027534  104036                          ERROR   36              ;SR2 DID NOT LOCK UP VIRTUAL ADDR. OF R/O VIOL.
 1945                                                                  ;FOR TIGHTER SCOPE LOOP
 1946                                                                  ;REPLACE ERROR CALL WITH
 1947                                                                  ;'BR 2$'' = 000757
 1948  027536  042737  160000  177572  4$:     BIC     #160000,SR0     ;CLEAR THE ERROR BITS IN SR0
 1949  027544  060101                          ADD     R1,R1           ;SETUP TO FORM NEXT VIRTUAL ADDRESS
 1950  027546  010100                          MOV     R1,R0           ;SETUP R0 TO FORM NEXT VIRT. ADDR. TO LOAD
 1951  027550  052701  100000                  BIS     #100000,R1      ;FORM VIRTUAL ADDR. THAT SHOULD BE LOCKED UP NEXT
 1952  027554  052700  060000                  BIS     #60000,R0       ;POINT R0 TO NEXT VIRT. ADDR. TO LOAD
 1953  027560  020127  110000                  CMP     R1,#110000      ;HAVE ALL VBA'S 100000-110000 BEEN TESTED?
 1954  027564  101743                          BLOS    2$              ;BRANCH IF NO
 1955
 1956  027566  012737  027420  001110  5$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
 1957  027574  012737  077406  172310          MOV     #77406,KIPDR4   ;RESTORE PDR4 TO R/W ACCESS
 1958  027602  012737  002150  000250          MOV     #MGMERR,MMVEC   ;RESTORE ADDRESS OF NORMAL M.M.
 1959                                                                  ;TRAP HANDLER TO M.M. VECTOR
 1960
 1974
 1975                                  ;;*****************************************************************
  (3)                                  ;*TEST 36       MORE CHECKS OF SR0 & SR2
  (4)                                  ;*
  (4)                                  ;*      THIS TEST PERFORMS SOME ADDITIONAL CHECKS OF THE SR0 & SR2 LOGIC.
  (4)                                  ;*      FIRST IT CHECKS THAT SR2 'TRACKS'' ALONG ACTING AS A VIRTUAL ADDRESS
  (4)                                  ;*      PROGRAM COUNTER.  ALSO SR0 & SR2 ARE LOCKED UP BY A PAGE LENGTH
  (4)                                  ;*      ABORT. THEN WITHOUT CLEARING SR0'S ERROR BITS, A R/O ABORT IS CAUSED.
  (4)                                  ;*      SR0 & SR2 SHOULD NOT BE CHANGED BY THE SECOND ABORT AND THE
  (4)                                  ;*      INFORMATION ABOUT THE PAGE LENGTH ABORT SOULD STILL BE LOCKED UP.
  (4)                                  ;*      IN ADDITION A 'RESET'' IS EXECUTED TO VERIFY THAT SR0 IS CLEARED
  (4)                                  ;*      AND SR2 IS UNLOCKED BY A RESET.  AFTER MEMORY MANAGEMENT IS TURNED BACK ON,
  (4)                                  ;*      SR2 IS CHECKED TO SEE THAT IT IS TRACKING AGAIN.
  (4)                                  ;*
  (3)                                  ;*****************************************************************
  (2)   027610  000004          TST36:  SCOPE
 1976  027612  012737  000600  172352  1$:     MOV     #600,KIPAR5     ;MAP KERNEL PAGE 5 TO 12-16K
 1977  027620  012737  000406  172310          MOV     #406,KIPDR4     ;SETUP PDR4 FOR PAGE LENGTH ABORT
 1978  027626  012737  077402  172312          MOV     #77402,KIPDR5   ;SETUP PDR5 FOR R/O ABORT
 1979  027634  012737  027642  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
 1980  027642  013737  177576  001274  2$:     MOV     SR2,WASSR2      ;READ SR2 TO SEE IF ITS TRACKING
 1981  027650  012701  027642                  MOV     #2$,R1          ;PUT EXPECTED VIRTUAL PC IN R1
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 1982  027654  020137  001274                    CMP     R1,WASSR2       ;DID SR2 CONTAIN VIRTUAL PC AT 2$?
 1983  027660  001401                            BEQ     3$              ;BRANCH IF YES
 1984  027662  104041                            ERROR   41              ;SR2 NOT TRACKING CORRECTLY
 1985                                                                    ;FOR TIGHTER SCOPE LOOP
 1986                                                                    ;REPLACE ERROR CALL WITH
 1987                                                                    ;'BR 2$'' = 000767
 1988  027664  012737  027672  001110  3$:       MOV     #4$,$LPERR      ;SET LOOP ON ERROR POINTER TO 4$
 1989  027672  013737  177576  001274  4$:       MOV     SR2,WASSR2      ;READ SR2 TO SEE IF ITS TRACKING
 1990  027700  012701  027672                    MOV     #4$,R1          ;PUT EXPECTED VIRTUAL PC IN R1
 1991  027704  020137  001274                    CMP     R1,WASSR2       ;DID SR2 CONTAIN VIRTUAL PC AT 4$
 1992  027710  001401                            BEQ     5$              ;BRANCH IF YES
 1993  027712  104041                            ERROR   41              ;SR2 NOT TRACKING CORRECTLY
 1994                                                                    ;FOR TIGHTER SCOPE LOOP
 1995                                                                    ;REPLACE ERROR CALL WITH
 1996                                                                    ;'BR 4$'' = 000767
 1997  027714  012737  027722  001110  5$:       MOV     #6$,$LPERR      ;SET LOOP ON ERROR POINTER TO 6$
 1998  027722  012737  027740  000250  6$:       MOV     #7$,MMVEC       ;PUT ADDRESS OF 7$ IN M.M. TRAP VECTOR
 1999  027730  005037  001200                    CLR     $TMP1           ;CLEAR ERROR INDICATOR
 2000  027734  005237  100500                    INC     @#100500        ;CAUSE PAGE LENGTH ABORT - TRAP TO 7$
 2001  027740  012706  001100          7$:       MOV     #KERSTK,KSP     ;RESTORE STACK POINTER AFTER ABORT
 2002  027744  013737  177572  001176            MOV     SR0,$TMP0       ;SAVE SR0'S INFORMATION ON PG. LGTH. ABORT
 2003  027752  013737  177576  001202            MOV     SR2,$TMP2       ;SAVE SR2'S INFORMATION ON PG. LGTH. ABORT
 2004  027760  012737  027772  000250            MOV     #8$,MMVEC       ;PUT ADDRESS OF 8$ IN M.M. TRAP VECTOR
 2005  027766  005237  120000                    INC     @#120000        ;CAUSE R/O ABORT - TRAP TO 8$
 2006  027772  012706  001100          8$:       MOV     #KERSTK,KSP     ;RESTORE STACK POINTER AFTER ABORT
 2007  027776  013737  177572  001272            MOV     SR0,WASSR0      ;READ SR0 FOLLWOING SECOND KT ABORT
 2008  030004  013737  177576  001274            MOV     SR2,WASSR2      ;READ SR2 FOLLOWING SECOND KT ABORT
 2009  030012  023737  001176  001272            CMP     $TMP0,WASSR0    ;IS SR0 STILL HOLDING INFO ON FIRST ABORT?
 2010  030020  001402                            BEQ     9$              ;BRANCH IF YES
 2011  030022  005237  001200                    INC     $TMP1           ;SET ERROR INDICATOR
 2012  030026  023737  001202  001274  9$:       CMP     $TMP2,WASSR2    ;DOES SR2 STILL HOLD PC OF FIRST ABORT?
 2013  030034  001402                            BEQ     10$             ;BRANCH IF YES
 2014  030036  005237  001200                    INC     $TMP1           ;SET ERROR INDICATOR
 2015  030042  005737  001200          10$:      TST     $TMP1           ;WERE SR0 OR SR2 CHANGED BY A SECOND ABORT?
 2016  030046  001401                            BEQ     11$             ;BRANCH IF NO
 2017  030050  104037                            ERROR   37              ;ONE OF STATUS REGS. CHANGED BY SECOND ABORT
 2018                                                                    ;FOR TIGHTER SCOPE LOOP
 2019                                                                    ;REPLACE ERROR CALL WITH
 2020                                                                    ;'BR 6$'' = 000726
 2021  030052  005037  001200          11$:      CLR     $TMP1           ;CLEAR ERROR INDICATOR
 2022  030056  000005                            RESET                   ;EXECUTE A RESET, APPLYING AN ''INIT''
 2023  030060  013737  177572  001272            MOV     SR0,WASSR0      ;READ SR0
 2024  030066  005737  001272                    TST     WASSR0          ;WAS SR0 CLEARED BY THE RESET?
 2025  030072  001402                            BEQ     12$             ;BRANCH IF YES
 2026  030074  005237  001200                    INC     $TMP1           ;SR0 NOT CLEARED BY A RESET
 2027  030100  013737  177576  001274  12$:      MOV     SR2,WASSR2      ;READ SR2
 2028  030106  022737  030100  001274            CMP     #12$,WASSR2     ;WAS SR2 UNLOCKED BY A RESET?
 2029  030114  001402                            BEQ     13$             ;BRANCH IF YES
 2030  030116  005237  001200                    INC     $TMP1           ;SR2 NOT UNLOCKED BY A RESET
 2031  030122  005737  001200          13$:      TST     $TMP1           ;WERE SR0 & SR2 BOTH 'RESET'' BY A RESET?
 2032  030126  001401                            BEQ     14$             ;BRANCH IF YES
 2033  030130  104040                            ERROR   40              ;SR0 OR SR2 NOT 'RESET'' BY A RESET
 2034                                                                    ;FOR TIGHTER SCOPE LOOP
 2035                                                                    ;REPLACE ERROR CALL WITH
 2036                                                                    ;'BR 6$'' = 000676
 2037  030132  012737  000001  177572  14$:      MOV     #1,SR0          ;TURN MEMORY MANAGEMENT BACK ON
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 2038  030140  013737  177576  001274  15$:    MOV     SR2,WASSR2      ;READ SR2 TO SEE IF ITS TRACKING AGAIN
 2039  030146  012701  030140                  MOV     #15$,R1         ;PUT EXPECTED VIRTUAL PC IN R1
 2040  030152  020137  001274                  CMP     R1,WASSR2       ;DID SR2 CONTAIN VIRTUAL PC AT 15$
 2041  030156  001401                          BEQ     16$             ;BRANCH IF YES
 2042  030160  104041                          ERROR   41              ;SR2 NOT TRACKING CORRECTLY
 2043                                                                  ;FOR TIGHTER SCOPE LOOP
 2044                                                                  ;REPLACE ERROR CALL WITH
 2045                                                                  ;'BR 6$'' = 000663
 2046  030162  012737  027612  001110  16$:    MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
 2047  030170  012737  077406  172310          MOV     #77406,KIPDR4   ;RESET PDR4 TO 128 BLKS, R/W
 2048  030176  012737  077406  172312          MOV     #77406,KIPDR5   ;RESET PDR5 TO 128 BLKS, R/W
 2049  030204  012737  002150  000250          MOV     #MGMERR,MMVEC   ;RESTORE ADDRESS OF NORMAL MEMORY
 2050                                                                  ;MANAGEMENT TRAP ROUTINE TO M.M. VECTOR
 2051
 2063
 2064                                  ;;*****************************************************************
  (3)                                  ;*TEST 37       USER ABORT PICKS UP KERNEL SPACE VECTOR
  (4)                                  ;*
  (4)                                  ;*      THIS TEST CHECKS TO BE SURE THAT WHEN AN ABORT OCCURS WHILE IN
  (4)                                  ;*      USER MODE, THE TRAP VECTOR INFORMATION FETCHED IS TAKEN FROM
  (4)                                  ;*      KERNEL SPACE.  USER PAGE 0 IS MAPPED TO 12K (60000-77776) SO
  (4)                                  ;*      THAT IF USER SPACE IS USED INSTEAD OF KERNEL, THE NEW PC THAT
  (4)                                  ;*      WAS LOADED AT LOC. 060004 IS USED INSTEAD OF THE NEW PC THAT
  (4)                                  ;*      SHOULD BE PICKED UP FROM LOC. 000004.  A TIMEOUT ERROR IS USED
  (4)                                  ;*      TO CAUSE A TRAP TO ''4''.
  (4)                                  ;*
  (3)                                  ;;*****************************************************************
  (2)  030212  000004                  TST37:  SCOPE
 2065  030214  004737  035100          1$:     JSR     PC,TOFF         ;TURN OFF T-BIT TRAPPING FOR THIS TEST
 2066  030220  012737  030226  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
 2067  030226  005037  177776          2$:     CLR     PSW             ;GO TO KERNEL MODE
 2068  030232  012706  001100                  MOV     #KERSTK,KSP     ;SETUP KERNEL STACK PTR.
 2069  030236  012737  000600  177640          MOV     #600,UIPAR0     ;MAP USER PAGE 0 TO 12K
 2070  030244  012737  030326  000004          MOV     #4$,@#4         ;LOAD KERNEL VECTOR 4 (LOC.4) WITH 4$
 2071  030252  012737  000340  000006          MOV     #340,@#6        ;LOAD VECTOR+2 WITH NEW PSW
 2072  030260  012737  140000  177776          MOV     #140000,PSW     ;GO TO USER MODE
 2073  030266  012706  000700                  MOV     #USESTK,USP     ;SETUP USER STACK PTR.
 2074  030272  012737  030312  000004          MOV     #3$,@#4         ;LOAD USER VECTOR 4 (LOC. 60004) WITH 3$
 2075  030300  012737  000340  000006          MOV     #340,@#6        ;LOAD VECTOR+2 WITH NEW PSW
 2076  030306  005737  160000                  TST     160000          ;CAUSE TIMEOUT ERROR TRAP TO ''4''
 2077                                                                  ;SHOULD PICK UP NEW PC=4$ FROM KERNEL
 2078                                                                  ;LOC  4, NOT PC=3$ FROM USER LOC. 4 (=60004)
 2079  030312  013701  177776          3$:     MOV     PSW,R1          ;SAVE PSW FOR ERROR
 2080  030316  010602                          MOV     SP,R2           ;SAVE VALUE OF STACK POINTER FOR ERROR
 2081  030320  005037  177776                  CLR     PSW             ;BE SURE BACK IN KERNEL MODE
 2082  030324  104042                          ERROR   42              ;DID NOT TRAP THRU KERNEL SPACE
 2083                                                                  ;FOR TIGHTER SCOPE LOOP
 2084                                                                  ;REPLACE ERROR CALL WITH
 2085                                                                  ;'BR 2$'' = 000740
 2086  030326  005037  177776          4$:     CLR     PSW             ;BE SURE BACK IN KERNEL MODE
 2087  030332  012706  001100                  MOV     #KERSTK,KSP     ;RESTORE KERNEL S.P. IN CASE IT CHANGED
 2088  030336  005037  177640                  CLR     UIPAR0          ;REMAP USER PAGE 0 TO 0-4K
 2089  030342  012737  140000  177776          MOV     #140000,PSW     ;GO TO USER MODE
 2090  030350  012706  000700                  MOV     #USESTK,USP     ;RESTORE USER STACK POINTER
 2091  030354  005037  177776                  CLR     PSW             ;GO BACK TO KERNEL MODE
 2092  030360  012737  002076  000004          MOV     #TIMERR,@#4     ;RESTORE ADDR. OF NORMAL CPU TRAP HANDLER TO 4
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 2093  030366  012737  030214  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
 2094  030374  004737  035134                  JSR     PC,TON          ;TURN T-BIT TRAPPING BACK ON
 2095
 2102                                  ;;*****************************************************************
  (3)                                  ;*TEST 40       RTI IN USER MODE DOES NOT CHANGE PSW
  (4)                                  ;*
  (4)                                  ;*      THIS TEST CHECKS TO SEE THAT WHEN AN RTI IS EXECUTED IN USER
  (4)                                  ;*      MODE, THE MODE OR PRIORITY BITS OF THE PSW ARE NOT CHANGED.
  (4)                                  ;*
  (3)                                  ;*****************************************************************
  (2)  030400  000004                  TST40:  SCOPE
 2103
 2104  030402  012737  030414  001110  1$:     MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
 2105  030410  012702  170000                  MOV     #170000,R2      ;LOAD "PRESENT & EXPECTED" PSW VALUE INTO R2
 2106  030414  010237  177776          2$:     MOV     R2,PSW          ;GO TO USER MODE-PRIORITY 0
 2107  030420  012746  000340                  MOV     #340,-(SP)      ;PUT A NEW PSW (PRIORITY=7) ON STACK
 2108  030424  012746  030432                  MOV     #3$,-(SP)       ;PUT NEW PC ON THE STACK
 2109  030430  000002                          RTI                     ;DO AN RTI FROM USER MODE
 2110  030432  013701  177776          3$:     MOV     PSW,R1          ;READ NEW PSW INTO R1
 2111  030436  042701  007437                  BIC     #7437,R1        ;MASK OFF COND. CODE, T-BIT, AND UNUSED BITS
 2112  030442  005037  177776                  CLR     PSW             ;GO BACK TO KERNEL MODE
 2113  030446  020201                          CMP     R2,R1           ;DID PSW STAY IN USER, PRIORITY=0?
 2114  030450  001401                          BEQ     4$              ;BRANCH IF YES
 2115  030452  104060                          ERROR   60              ;PSW CHANGED BY AN RTI FROM USER
 2116                                                                  ;FOR A TIGHTER SCOPE LOOP
 2117                                                                  ;REPLACE ERROR CALL WITH
 2118                                                                  ;"BR=2$" = 000760
 2119  030454  012737  030402  001110  4$:     MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
 2120
 2132
 2133
 2134                                  ;;*****************************************************************
  (3)                                  ;*TEST 41       KT ERROR SERVICED BEFORE TIMEOUT ERROR
  (4)                                  ;*
  (4)                                  ;*      THIS TEST CHECKS TO SEE THAT IF A CERTAIN VIRTUAL ADDRESS THAT
  (4)                                  ;*      WOULD CAUSE A MEMORY MANAGEMENT ERROR CAUSES A TIMEOUT
  (4)                                  ;*      ERROR FIRST, THE TIMEOUT ERROR IS SERVICED BUT THE MEMORY
  (4)                                  ;*      MANAGEMENT ERROR ISN'T.  THIS MEANS THAT SR0 AND SR2
  (4)                                  ;*      SHOULD NOT REPORT THE ERROR OR LOCK UP ITS VIRTUAL ADDRESS.
  (4)                                  ;*      A READ-ONLY VIOLATION IS USED AS THE POTENTIAL MEMORY MANAGEMENT
  (4)                                  ;*      ERROR
  (4)                                  ;*
  (3)                                  ;*****************************************************************
  (2)  030462  000004                  TST41:  SCOPE
 2135  030464  012705  077006          1$:     MOV     #77006,R5       ;LOAD PDR7 DATA INTO R5
 2136  030470  010537  172316                  MOV     R5,KIPDR7       ;MAP PAGE 7 R/W  PLF=176
 2137  030474  012737  030522  000004          MOV     #3$,@#4         ;SET CPU TRAP VECTOR TO ADDRESS OF 3$
 2138  030502  012737  030524  000250          MOV     #4$,@#250       ;SET M.M. TRAP VECTOR TO ADDRESS OF 4$
 2139  030510  012737  030516  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
 2140  030516  005237  177700          2$:     INC     @#177700        ;CAUSE PLF ABORT AND POTENTIAL TIMEOUT
 2141  030522  104043                  3$:     ERROR   43              ;TRAPPED THRU CPU TRAP VECTOR BUT SHOULDN'T HAVE
 2142                                                                  ;FOR TIGHTER SCOPE LOOP
 2143                                                                  ;REPLACE ERROR CALL WITH
 2144                                                                  ;"BR 2$" = 000776
 2145  030524  012706  001100          4$:     MOV     #KERSTK,KSP     ;RESTORE STACK POINTER AFTER TRAPPING
 2146  030530  013737  177572  001272          MOV     SR0,WASSR0      ;READ STATUS REG.0
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2147  030536  013737  177576  001274  5$:     MOV     SR2,WASSR2      ;READ STATUS REG. 2
2148  030544  012700  040017          5$:     MOV     #40017,R0       ;LOAD EXPECTED SR0 CONTENTS INTO R0
2149  030550  020037  001272          5$:     CMP     R0,WASSR0       ;SR0 PLF ERROR BIT SET?
2150  030554  001401          5$:     BEQ     6$              ;BRANCH IF YES
2151  030556  104044          5$:     ERROR   44              ;SR0 DIDN'T REPORT PLF ERROR
2152                                                          ;FOR TIGHTER SCOPE LOOP
2153                                                          ;REPLACE ERROR CALL WITH
2154                                                          ;'BR 2$'' = 000741
2155  030560  012701  030516          6$:     MOV     #2$,R1          ;LOAD EXPECTED SR2 CONTENTS INTO R1
2156  030564  020137  001274          6$:     CMP     R1,WASSR2       ;WAS SR2 LOCKED BY PLF ABORT?
2157  030570  001401          6$:     BEQ     7$              ;BRANCH IF YES
2158  030572  104044          6$:     ERROR   44              ;SR2 DIDN'T LOCK UP VIRTUAL ADDRESS
2159                                                          ;FOR TIGHTER SCOPE LOOP
2160                                                          ;REPLACE ERROR CALL WITH
2161                                                          ;'BR 2$'' = 000741
2162  030574  042737  160000  177572  7$:     BIC     #160000,SR0     ;CLEAR ERROR BITS THAT WERE SET IN SR0
2163  030602  012737  002076  000004          MOV     #TIMERR,@#4     ;RESTORE ADDRESS OF NORMAL CPU TRAP HANDLER
2164  030610  012737  002150  000250          MOV     #MGMERR,@#250   ;RESTORE ADDRESS OF NORMAL M.M. TRAP HANDLER
2165  030616  012737  077406  172316          MOV     #77406,KIPDR7   ;REMAP PAGE 7 TO READ/WRITE PLF=177
2166  030624  012737  030464  001110          MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2167
2182
2183                                  ;;*****************************************************************
  (3)                                 ;*TEST 42       PC & PSW SAVED FOR KT ERROR DURING SERVICE OF TIMEOUT ERROR
  (4)                                 ;*
  (4)                                 ;*      THIS TEST CHECKS THE PC AND PROCESSOR STATUS WORD SAVED WHEN
  (4)                                 ;*      A KT ERROR OCCURS DURING THE SECOND PUSH ON THE STACK DURING
  (4)                                 ;*      SERVICING OF A TIMEOUT ERROR.  DURING A 'DOUBLE ERROR''
  (4)                                 ;*      SEQUENCE SUCH AS THIS, THE PSW SAVED WILL BE THE ONE PICKED UP
  (4)                                 ;*      FROM VECTOR+2 (LOC. 6 IN THIS CASE) AFTER THE FIRST TRAP,
  (4)                                 ;*      NOT THE PSW PRESENT BEFORE THE FIRST TRAP.  SR0 AND SR2
  (4)                                 ;*      SHOULD RECORD THE KT ERROR (A R/O VIOLATION BY THE USER STACK PTR.)
  (4)                                 ;*
  (4)                                 ;*      NOTE THAT THE PREVIOUS MODE BITS <13:12> OF THE PSW
  (4)                                 ;*      WILL BE SET IN THE PSW THAT IS SAVED.
  (4)                                 ;*
  (3)                                 ;;*****************************************************************
  (2)  030632  000004          TST42:  SCOPE
2184  030634  004737  035100          1$:     JSR     PC,TOFF         ;TURN T-BIT TRAPPING OFF FOR THIS TEST
2185  030640  012737  000600  177646          MOV     #600,UIPAR3     ;MAP USER PAGE 3 TO 12-16K
2186  030646  012737  000600  177650          MOV     #600,UIPAR4     ;MAP USER PAGE 4 TO 12-16K
2187  030654  012737  077402  177606          MOV     #77402,UIPDR3   ;MAP USER PAGE 3 READ-ONLY
2188  030662  012737  077406  177610          MOV     #77406,UIPDR4   ;MAP USER PAGE 4 READ/WRITE
2189  030670  012737  030744  000004          MOV     #4$,@#4         ;LOAD ADDRESS OF 4$ IN CPU (TIMEOUT) VECTOR
2190  030676  012737  140017  000006          MOV     #140017,@#6     ;LOAD PSW THAT SHOULD BE PUT ON STACK IN VECTOR+2
2191  030704  012737  030744  000250          MOV     #4$,@#250       ;LOAD ADDRESS OF 4$ IN M.M. TRAP VECTOR
2192  030712  012737  000340  000252          MOV     #340,@#252      ;LOAD A KERNEL PSW IN MMVEC+2
2193  030720  012737  030726  001110          MOV     #2$,$LPERR      ;SET LOOP ON ERROR POINTER TO 2$
2194  030726  012737  140000  177776  2$:     MOV     #140000,PSW     ;GO TO USER MODE
2195  030734  012706  100002          3$:     MOV     #100002,USP     ;SET USER STACK PTR. SO SECOND PUSH IS IN PG. 3
2196  030740  005737  177700          3$:     TST     @#177700        ;CAUSE TIMEOUT ERROR THAT WILL CAUSE
2197                                                          ;R/O ERROR WHEN TRY TO SAVE OLD PC
2198  030744  016601  000002          4$:     MOV     2(KSP),R1       ;PUT PSW SAVED ON KERNEL STACK INTO R1
2199  030750  011603                  4$:     MOV     (KSP),R3        ;PUT PC SAVED ON KERNEL STACK INTO R3
2200  030752  013737  177572  001272          MOV     SR0,WASSR0      ;READ THE CONTENTS OF M.M. STATUS REG. 0
2201  030760  013737  177576  001274          MOV     SR2,WASSR2      ;READ THE CONTENTS OF M.M. STATUS REG. 2
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2202  030766  042737  160000  177572        BIC     #160000,SR0     ;CLEAR THE ERROR BITS IN SR0
2203  030774  005037  177776                CLR     PSW             ;BE SURE IN KERNEL MODE
2204  031000  012706  001100                MOV     #KERSTK,KSP     ;RESTORE KERNEL STACK POINTER
2205  031004  012737  140000  177776        MOV     #140000,PSW     ;GO TO USER MODE
2206  031012  012706  000700                MOV     #USESTK,USP     ;RESTORE USER STACK POINTER
2207  031016  005037  177776                CLR     PSW             ;GO BACK TO KERNEL MODE
2208  031022  005037  001176                CLR     $TMP0           ;CLEAR ERROR INDICATOR
2209  031026  020127  170017                CMP     R1,#170017      ;WAS THE PSW SAVED THE ONE PICKED UP BY THE
2210                                                                ;TIMEOUT TRAP FROM ERRVEC+2?
2211                                                                ;VALUE 170017 = PSW FROM LOC. 6 WITH
2212                                                                ;PREVIOUS MODE BITS = USER
2213  031032  001402                        BEQ     5$              ;BRANCH IF YES
2214  031034  005237  001176                INC     $TMP0           ;WRONG PSW SAVED DURING ''DOUBLE ERROR'' SEQUENCE
2215  031040  020327  030744        5$:     CMP     R3,#3$+4        ;WAS THE PC AT THE TIME OF THE TIMEOUT ERROR
2216                                                                ;SAVED ON THE STACK?
2217  031044  001402                        BEQ     6$              ;BRANCH IF YES
2218  031046  005237  001176                INC     $TMP0           ;WRONG PC SAVED DURING TRAP SEQUENCE
2219  031052  023727  001272  020147  6$:   CMP     WASSR0,#20147   ;DID SR0 REPORT - USER, PAGE 3, R/O ABORT?
2220  031060  001402                        BEQ     7$              ;BRANCH IF YES
2221  031062  005237  001176                INC     $TMP0           ;SR0 DID NOT REPORT R/O ABORT
2222  031066  023727  001274  030740  7$:   CMP     WASSR2,#3$      ;DID SR2 LOCK UP VIRTUAL ADDR. OF LAST
2223                                                                ;INSTRUCTION SUCCESSFULLY FETCHED?
2224  031074  001402                        BEQ     8$              ;BRANCH IF YES
2225  031076  005237  001176                INC     $TMP0           ;SR2 DID NOT LOCK UP ADDR. OF TIMEOUT INST.
2226  031102  005737  001176        8$:     TST     $TMP0           ;ANY ''ERRORS'' DURING TRAP SEQUENCE?
2227  031106  001401                        BEQ     9$              ;BRANCH IF NO
2228  031110  104045                        ERROR   45              ;THE WRONG PC OR PSW WERE SAVED
2229                                                                ;OR SR0 OR SR2 DID NOT REPORT R/O
2230                                                                ;ERROR DURING TIMEOUT - KT TRAP
2231                                                                ;SEQUENCE
2232                                                                ;FOR TIGHTER SCOPE LOOP
2233                                                                ;REPLACE ERROR CALL WITH
2234                                                                ;''BR 2$'' = 000710
2235  031112  012737  002076  000004  9$:     MOV     #TIMERR,@#4     ;RESTORE ADDRESS OF NORMAL CPU TRAP HANDLER
2236  031120  012737  000340  000006        MOV     #340,@#6        ;RELOAD ERRVEC+2 WITH KERNEL PSW
2237  031126  012737  002150  000250        MOV     #MGMERR,@#250   ;RESTORE ADDRESS OF NORMAL M.M. TRAP HANDLER
2238  031134  012737  077406  177606        MOV     #77406,UIPDR3   ;REMAP USER PAGE 3 READ/WRITE
2239  031142  012737  030634  001110        MOV     #1$,$LPERR      ;RESET LOOP ON ERROR POINTER TO 1$
2240  031150  004737  035134                JSR     PC,TON          ;TURN T-BIT TRAPPING BACK ON
2241                                ;;*****************************************************************
2242                                ;*
2243                                ;*      THIS GROUP OF TESTS WILL TEST ALL THE LOGIC ASSOCIATED WITH
2244                                ;*      THE ''MOVE FROM PREVIOUS'' AND MOVE TO PREVIOUS'' INSTRUCTIONS.
2245                                ;*
2246                                ;;*****************************************************************
2247
2248
2260                                ;;*****************************************************************
 (3)                                ;*TEST 43       MOVE FROM PREVIOUS (USER) I-SPACE
 (4)                                ;*
 (4)                                ;*      THIS TEST USES THE 'MFPI' INSTRUCTION TO ENSURE THAT THE
 (4)                                ;*      PREVIOUS MODE IS CLOCKED CORRECTLY
 (4)                                ;*      THERE IS A DESCRIPTION BEFORE EACH DESTINATION MODE TESTED,
 (4)                                ;*
 (4)                                ;*
 (4)                                ;*      IF THE CORRECT MODE (USER) IS NOT ENABLED A NON-RESIDENT ABORT
```

```
(4)
(4)
(3)
(2)  031154  000004
2261  031156  005037  172340          TST43:  SCOPE
2262  031162  012737  000200  172342  1$:     CLR     KIPAR0          ;MAP KERNEL PAGE 0 TO 0-4K
2263  031170  012737  000400  172344          MOV     #200,KIPAR1     ;MAP KERNEL PAGE 1 TO 4-8K
2264  031176  012737  000600  172346          MOV     #400,KIPAR2     ;MAP KERNEL PAGE 2 TO 8-12K
2265  031204  012737  000600  172350          MOV     #600,KIPAR3     ;MAP KERNEL PAGE 3 TO 12-16K
2266  031212  012737  007600  172356          MOV     #600,KIPAR4     ;MAP KERNEL PAGE 4 TO 12-16K
2267  031220  012700  077406                  MOV     #7600,KIPAR7    ;MAP KERNEL PAGE 7 TO THE I/O PAGE
2268                                          MOV     #77406,R0       ;MAKE ALL KERNEL I-SPACE PAGES RESIDENT
2269  031224  012702  000010                                          ;READ/WRITE, LENGTH 200 BLOCKS
2270  031230  012701  172300                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
2271  031234  010021                  2$:     MOV     #KIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
2272  031236  077202                          MOV     R0,(R1)+        ;LOAD PDR WITH 77406
2273  031240  012702  000010                  SOB     R2,2$           ;LOOP TO 2$ UNTIL ALL PDRS LOADED
2274  031244  012701  177600                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
2275  031250  010021                  3$:     MOV     #UIPDR0,R1      ;PUT ADDRESS OF FIRST PDR IN R1
2276  031252  077202                          MOV     R0,(R1)+        ;LOAD PDR WITH 77406
2277  031254  012737  000000  177640          SOB     R2,3$           ;LOOP TO 3$ UNTIL ALL PDRS LOADED
2278  031262  012737  000200  177642          MOV     #000,UIPAR0     ;MAP USER I PAGE 0 TO 0-4K
2279  031270  012737  000400  177644          MOV     #200,UIPAR1     ;MAP USER I PAGE 1 TO 4-8K
2280  031276  012737  000600  177646          MOV     #400,UIPAR2     ;MAP USER I PAGE 2 TO 8-12K
2281  031304  012737  007600  177656          MOV     #600,UIPAR3     ;MAP USER I PAGE 3 TO 12-16K
2282  031312  012737  031320  001110          MOV     #7600,UIPAR7    ;MAP USER I PAGE 7 TO THE I/O PAGE
2283  031320                          4$:     MOV     #4$,$LPERR      ;SET LOOP ON ERROR TO 4$
2284  031320  012737  077406  172310          MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
2285  031326  012737  000600  172350          MOV     #600,KIPAR4     ;MAP KERNEL I PAGE 4 TO 12K
2286  031334  012737  000600  177650          MOV     #600,UIPAR4     ;MAP USER I PAGE 4 TO 12K
2287  031342  012700  036514                  MOV     #36514,R0       ;LOAD DATA PATTERN INTO R0
2288  031346  010037  100000                  MOV     R0,@#100000     ;LOAD DATA PATTERN INTO PHY 60000
2289  031352  012737  031754  000250          MOV     #23$,MMVEC      ;SET M.M. VECTOR TO 23$
2290  031360  105037  172310                  CLRB    KIPDR4          ;MAKE KERNEL I-SPACE PAGE 4 NON-RESIDENT
2291                                          ;THE FOLLOWING WILL TEST DSTM=0 MFPI
2292                                          ;
2293  031364  012737  031372  001110          MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
2294  031372  012737  030340  177776  5$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2295  031400  006506                  6$:     MFPI    USP             ;PUT USER STACK POINTER ON KERNEL
2296                                                                  ;STACK
2297  031402  022706  001100                  CMP     #KERSTK,KSP     ;WAS SOMETHING PUSHED ON STACK AT 6$
2298  031406  001407                          BEQ     7$              ;BRANCH IF NOTHING WAS PUSHED
2299  031410  012600                          MOV     (KSP)+,R0       ;POP KERNEL STACK INTO R0
2300  031412  012701  000700                  MOV     #USESTK,R1      ;EXPECTING TO GET 700 AS USP
2301  031416  020001                          CMP     R0,R1           ;DID YOU GET THE RIGHT POINTER?
2302  031420  001403                          BEQ     8$              ;BRANCH IF YOU DID
2303  031422  104046                          ERROR   46              ;WRONG THING WAS PUSHED ON STACK
2304                                                                  ;FOR TIGHTER SCOPE LOOP
2305                                                                  ;REPLACE ERROR CALL WITH
2306                                                                  ;'BR 5$'' = 000763
2307  031424  000401                          BR      8$              ;BRANCH TO NEXT TRY
2308  031426  104050                  7$:     ERROR   50              ;NOTHING PUSHED ON STACK
2309                                                                  ;FOR TIGHTER SCOPE LOOP
2310                                                                  ;REPLACE ERROR CALL WITH
2311                                                                  ;'BR 5$'' = 000761
2312  031430                          8$:     ;THE FOLLOWING WILL TEST DSTM=1 MFPI.
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2313  031430  012737  031442  001110          MOV     #9$,$LPERR      ;SET LOOP ON ERROR POINTER TO 9$
2314  031436  012700  036514                  MOV     #36514,R0       ;RELOAD DATA PATTERN IN R0
2315  031442  012737  030340  177776  9$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2316  031450  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
2317  031454  006512                          MFPI    (R2)            ;READ FROM PHYSICAL 60000
2318  031456  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
2319  031460  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
2320  031462  001401                          BEQ     10$             ;BRANCH IF CORRECT DATA WAS FETCHED
2321  031464  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
2322                                                                  ;FOR TIGHTER SCOPE LOOP
2323                                                                  ;REPLACE ERROR CALL WITH
2324                                                                  ;'BR 9$'' = 000766
2325  031466                          10$:    ;THE FOLLOWING WILL TEST DSTM=2 MFPI.
2326  031466  012737  031474  001110          MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
2327  031474  012737  030340  177776  11$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2328  031502  012702  100000                  MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
2329  031506  006522                          MFPI    (R2)+           ;READ FROM PHYSICAL 60000
2330  031510  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
2331  031512  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
2332  031514  001401                          BEQ     12$             ;BRANCH IF CORRECT DATA WAS FETCHED
2333  031516  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
2334                                                                  ;FOR TIGHTER SCOPE LOOP
2335                                                                  ;REPLACE ERROR CALL WITH
2336                                                                  ;'BR 11$'' = 000766
2337  031520                          12$:    ;THE FOLLOWING WILL TEST DSTM=3 MFPI.
2338  031520  012737  031526  001110          MOV     #13$,$LPERR     ;SET LOOP ON ERROR POINTER TO 13$
2339  031526  012737  030340  177776  13$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2340  031534  006537  100000                  MFPI    @#100000        ;READ FROM PHYSICAL 60000
2341  031540  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
2342  031542  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
2343  031544  001401                          BEQ     14$             ;BRANCH IF CORRECT DATA WAS FETCHED
2344  031546  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
2345                                                                  ;FOR TIGHTER SCOPE LOOP
2346                                                                  ;REPLACE ERROR CALL WITH
2347                                                                  ;'BR 13$'' = 000767
2348  031550                          14$:    ;THE FOLLOWING WILL TEST DSTM=4 MFPI.
2349  031550  012737  031556  001110          MOV     #15$,$LPERR     ;SET LOOP ON ERROR POINTER TO 15$
2350  031556  012737  030340  177776  15$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2351  031564  012702  100002                  MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
2352  031570  006542                          MFPI    -(R2)           ;READ FROM PHYSICAL 60000
2353  031572  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
2354  031574  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
2355  031576  001401                          BEQ     16$             ;BRANCH IF CORRECT DATA WAS FETCHED
2356  031600  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
2357                                                                  ;FOR TIGHTER SCOPE LOOP
2358                                                                  ;REPLACE ERROR CALL WITH
2359                                                                  ;'BR 15$'' = 000766
2360  031602                          16$:
2361                                  ;THE FOLLOWING WILL TEST DSTM=5 MFPI.
2362                                  ;
2363  031602  012737  031610  001110          MOV     #17$,$LPERR     ;SET LOOP ON ERROR POINTER TO 17$
2364  031610  012737  030340  177776  17$:    MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2365  031616  012737  100000  001202          MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR INTO LOC. $TMP2
2366  031624  012702  001204                  MOV     #<$TMP2+2>,R2   ;LOAD ADDR. OF $TMP2+2 INTO R2
2367  031630  006552                          MFPI    @-(R2)          ;READ FROM PHYSICAL 60000
2368  031632  012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
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2369  031634  020001                        CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
2370  031636  001401                        BEQ     18$             ;BRANCH IF CORRECT DATA WAS FETCHED
2371  031640  104046                        ERROR   46              ;WRONG DATA WAS FETCHED
2372                                                                ;FOR TIGHTER SCOPE LOOP
2373                                                                ;REPLACE ERROR CALL WITH
2374                                                                ;'BR 17$'' = 000763
2375  031642                          18$:  ;THE FOLLOWING WILL TEST DSTM=6 MFPI.
2376                                        ;
2377  031642  012737  031650  001110        MOV     #19$,$LPERR     ;SET LOOP ON ERROR POINTER TO 19$
2378  031650  012737  030340  177776  19$:  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2379  031656  005002                        CLR     R2              ;MAKE REGISTER 2 A ZERO
2380  031660  006562  100000                MFPI    100000(R2)      ;READ FROM PHYSICAL 60000
2381  031664  012601                        MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
2382  031666  020001                        CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
2383  031670  001401                        BEQ     20$             ;BRANCH IF CORRECT DATA WAS FETCHED
2384  031672  104046                        ERROR   46              ;WRONG DATA WAS FETCHED
2385                                                                ;FOR TIGHTER SCOPE LOOP
2386                                                                ;REPLACE ERROR CALL WITH
2387                                                                ;'BR 19$'' = 000766
2388  031674                          20$:  ;THE FOLLOWING WILL TEST DSTM=7 MFPI.
2389                                        ;
2390  031674  012737  031702  001110        MOV     #21$,$LPERR     ;SET LOOP ON ERROR POINTER TO 21$
2391  031702  012737  030340  177776  21$:  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2392  031710  012737  100000  001202        MOV     #100000,$TMP2   ;LOAD TEST LOC. V.A. INTO $TMP2
2393  031716  012702  001202                MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
2394  031722  006572  000000                MFPI    @0(R2)          ;USE $TMP2 TO FETCH VIRTUAL
2395                                                                ;ADDRESS OF 60000
2396  031726  012601                        MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
2397  031730  020001                        CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
2398  031732  001401                        BEQ     22$             ;BRANCH IF CORRECT DATA WAS FETCHED
2399  031734  104046                        ERROR   46              ;WRONG DATA WAS FETCHED
2400                                                                ;FOR TIGHTER SCOPE LOOP
2401                                                                ;REPLACE ERROR CALL WITH
2402                                                                ;'BR 21$'' = 000762
2403  031736  012737  002150  000250  22$:  MOV     #MGMERR,MMVEC   ;SET M.M. VECTOR TO NORMAL ROUTINE
2404  031744  012737  031156  001110        MOV     #1$,$LPERR      ;SET LOOP POINTER TO START OF TEST
2405  031752  000423                        BR      TST44           ;;BRANCH TO NEXT TEST
2406
2407
2408  031754  012637  001266          23$:  MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
2409  031760  012637  001270                MOV     (KSP)+,TRAPPS
2410  031764  013737  177572  001272        MOV     SR0,WASSR0      ;SAVE SR0 FOR ERROR TYPEOUT
2411  031772  013737  177576  001274        MOV     SR2,WASSR2      ;SAVE SR2 FOR ERROR TYPEOUT
2412  032000  042737  160000  177572        BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0 AND LEAVE
2413  032006  104051                        ERROR   51              ;TRIED TO READ NON-RESIDENT PAGE
2414                                                                ;FOR TIGHTER SCOPE LOOP
2415                                                                ;REPLACE ERROR CALL WITH
2416                                                                ;A 'NOP'' = 000240
2417  032010  013746  001270                MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
2418  032014  013746  001266                MOV     TRAPPC,-(KSP)
2419  032020  000002                        RTI
2420
2421
2433                                  ;;**********************************************************************
  (3)                                 ;*TEST 44        MOVE TO PREVIOUS (USER) I-SPACE
  (4)                                 ;*
```

```
(4)                                 ;*      THIS TEST USES THE 'MTPI' INSTRUCTION TO ENSURE THAT THE
(4)                                 ;*      PREVIOUS MODE IS CLOCKED CORRECTLY
(4)                                 ;*      THERE IS A DESCRIPTION BEFORE EACH DESTINATION MODE TESTED,
(4)                                 ;*
(4)                                 ;*
(4)                                 ;*      IF THE CORRECT MODE IS NOT ENABLED A NON-RESIDENT ABORT
(4)                                 *       WILL OCCUR AND TRAP TO 20$, WHERE THE ERRORS ARE REPORTED.
(4)                                 ;*
(3)                                 ;;*****************************************************************
(2) 032022 000004                   TST44:  SCOPE
2434 032024 012737 077406 172310    1$:     MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
2435 032032 012737 077406 177610            MOV     #77406,UIPDR4   ;USER I-SPACE PAGE 4 READ/WRITE
2436 032040 012737 000600 172350            MOV     #600,KIPAR4     ;MAP KERNEL I PAGE 4 TO 12K
2437 032046 012737 000600 177650            MOV     #600,UIPAR4     ;MAP USER I PAGE 4 TO 12K
2438 032054 012737 032634 00025C            MOV     #20$,MMVEC      ;SET M.M. VECTOR TO 20$
2439                                        ;THE FOLLOWING WILL TEST DSTM=0 MTPI
2440                                        ;
2441 032062 012737 030340 177776    2$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2442 032070 012746 007777                   MOV     #7777,-(KSP)    ;PUSH DATA ON KERNEL STACK
2443 032074 006606                          MTPI    USP             ;LOAD USER STACK POINTER
2444 032076 006506                          MFPI    USP             ;READ USER STACK POINTER
2445 032100 012601                          MOV     (KSP)+,R1       ;POP KERNEL STACK INTO R1
2446 032102 022701 007777                   CMP     #7777,R1        ;WAS USER STACK POINTER CHANGED
2447 032106 001401                          BEQ     3$              ;BRANCH IF IT WAS
2448 032110 104050                          ERROR   50              ;USER STACK POINTER NOT CHANGED
2449                                                                ;FOR TIGHTER SCOPE LOOP
2450                                                                ;REPLACE ERROR CALL WITH
2451                                                                ;'BR 2$'' = 000764
2452 032112 012737 030340 177776    3$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2453 032120 012746 000700                   MOV     #USESTK,-(KSP)  ;GET READY TO RESTORE USER S. POINT
2454 032124 006606                          MTPI    USP             ;RESTORE USER STACK POINTER
2455 032126                         4$:     ;THIS WILL TEST DSTM = 1 MTPI.
2456 032126 012737 032144 001110            MOV     #5$,$LPERR      ;SET LOOP ON ERROR POINTER TO 5$
2457 032134 012702 100000                   MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
2458 032140 012700 125252                   MOV     #125252,R0      ;LOAD TEST DATA INTO R0
2459 032144 010046                  5$:     MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
2460 032146 105037 172310                   CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
2461 032152 006612                          MTPI    (R2)            ;LOAD TEST DATA INTO PHYSICAL 60000
2462 032154 112737 000006 172310            MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
2463 032162 011201                          MOV     (R2),R1         ;READ FROM ADDRESS 60000
2464 032164 020001                          CMP     R0,R1           ;SEE IF DATA WAS STORED AT CORRECT PLACE
2465 032166 001401                          BEQ     6$              ;BRANCH IF STORE WAS CORRECT
2466 032170 104047                          ERROR   47              ;INCORRECT STORE
2467                                                                ;FOR TIGHTER SCOPE LOOP
2468                                                                ;REPLACE ERROR CALL WITH
2469                                                                ;'BR 5$'' = 000765
2470 032172                         6$.     ;THE FOLLOWING WILL TEST DSTM=2 MTPI.
2471                                        ;
2472 032172 012737 032216 001110            MOV     #8$,$LPERR      ;SET LOOP ON ERROR POINTER TO 8$
2473 032200 012737 030340 177776            MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2474 032206 012700 125252                   MOV     #125252,R0      ;LOAD TEST DATA INTO R0
2475 032212 012702 100000                   MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
2476 032216 010046                  8$:     MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
2477 032220 105037 172310                   CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
2478 032224 006612                          MTPI    (R2)            ;LOAD TEST DATA INTO PHYSICAL 60000
2479 032226 112737 000006 172310            MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESISENT
```

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2480  032234  013701  100000          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
2481  032240  020001                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
2482  032242  001401                  BEQ     9$              ;BRANCH IF STORE WAS CORRECT
2483
2484  032244  104047                  ERROR   47              ;INCORRECT STORE
2485                                                          ;FOR TIGHTER SCOPE LOOP
2486                                                          ;REPLACE ERROR CALL WITH
2487                                                          ;'BR 8$'' = 000764
2488  032246                  9$:     ;THIS WILL TEST DSTM = 3 MTPI.
2489  032246  012737  032266  001110  MOV     #10$,$LPERR     ;SET LOOP ON ERROR POINTER TO 10$
2490  032254  012737  030340  177776  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2491  032262  012700  052525          MOV     #52525,R0       ;LOAD TEST DATA INTO R0
2492  032266  010046                  10$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
2493  032270  105037  172310          CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
2494  032274  006637  100000          MTPI    @#100000        ;LOAD TEST DATA INTO PHYSICAL 60000
2495  032300  112737  000006  172310  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
2496  032306  013701  100000          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
2497  032312  020001                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
2498  032314  001401                  BEQ     11$             ;BRANCH IF STORE WAS CORRECT
2499  032316  104047                  ERROR   47              ;INCORRECT STORE
2500                                                          ;FOR TIGHTER SCOPE LOOP
2501                                                          ;REPLACE ERROR CALL WITH
2502                                                          ;'BR 10$'' = 000763
2503  032320                  11$:    ;THIS WILL TEST DSTM = 4 MTPI.
2504  032320  012737  032340  001110  MOV     #12$,$LPERR     ;SET LOOP ON ERROR POINTER TO 12$
2505  032326  012737  030340  177776  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2506  032334  012700  125252          MOV     #125252,R0      ;LOAD TEST DATA INTO R0
2507  032340  010046                  12$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
2508  032342  012702  100002          MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
2509  032346  105037  172310          CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
2510  032352  006642                  MTPI    -(R2)           ;LOAD TEST DATA INTO PHYSICAL 60000
2511  032354  112737  000006  172310  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
2512  032362  013701  100000          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
2513  032366  020001                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
2514  032370  001401                  BEQ     13$             ;BRANCH IF STORE WAS CORRECT
2515  032372  104047                  ERROR   47              ;INCORRECT STORE
2516                                                          ;FOR TIGHTER SCOPE LOOP
2517                                                          ;REPLACE ERROR CALL WITH
2518                                                          ;'BR 12$'' = 000762
2519  032374                  13$:    ;THE FOLLOWING WILL TEST DSTM=5 MTPI.
2520                                  ;
2521  032374  012737  032426  001110  MOV     #14$,$LPERR     ;SET LOOP ON ERROR POINTER TO 14$
2522  032402  012737  030340  177776  MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2523  032410  012700  052525          MOV     #52525,R0       ;LOAD TEST DATA INTO R0
2524  032414  012702  001204          MOV     #<$TMP2+2>,R2   ;LOAD ADDR. OF LOC. $TMP2+2 INTO R2
2525  032420  012737  100000  001202  MOV     #100000,$TMP2   ;LOAD VIRT. ADDR. OF TEST LOC. INTO $TMP2
2526  032426  010046                  14$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
2527  032430  105037  172310          CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
2528  032434  006652                  MTPI    @-(R2)          ;LOAD TEST DATA INTO PHYSICAL 60000
2529  032436  112737  000006  172310  MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
2530  032444  013701  100000          MOV     @#100000,R1     ;READ FROM ADDRESS 60000
2531  032450  020001                  CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
2532  032452  001401                  BEQ     15$             ;BRANCH IF STORE WAS CORRECT
2533  032454  104047                  ERROR   47              ;INCORRECT STORE
2534                                                          ;FOR TIGHTER SCOPE LOOP
2535                                                          ;REPLACE ERROR CALL WITH
```

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2536                                                        ;'BR 14$'' = 000764
2537  032456                              15$:    ;THIS WILL TEST DSTM = 6 MTPI.
2538                                              ;
2539  032456  012737  032500  001110              MOV     #16$,$LPERR     ;SET LOOP ON ERROR POINTER TO 16$
2540  032464  012737  030340  177776              MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2541  032472  012700  052525                      MOV     #52525,R0       ;LOAD TEST DATA INTO R0
2542  032476  005002                              CLR     R2              ;MAKE REGISTER 2 ZERO
2543  032500  010046                      16$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
2544  032502  105037  172310                      CLRB    KIPDR4          ;MAKE KERNEL I PAGE 4 NON-RESIDENT
2545  032506  006662  100000                      MTPI    100000(R2)      ;LOAD TEST DATA INTO PHYSICAL 60000
2546  032512  112737  000006  172310              MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
2547  032520  013701  100000                      MOV     @#100000,R1     ;READ FROM ADDRESS 60000
2548  032524  020001                              CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
2549  032526  001401                              BEQ     17$             ;BRANCH IF STORE WAS CORRECT
2550  032530  104047                              ERROR   47              ;INCORRECT STORE
2551                                                                      ;FOR TIGHTER SCOPE LOOP
2552                                                                      ;REPLACE ERROR CALL WITH
2553                                                                      ;'BR 16$'' = 000763
2554  032532                              17$:    ;THE FOLLOWING WILL TEST DSTM=7 MTPI.
2555                                              ;
2556  032532  012737  032564  001110              MOV     #18$,$LPERR     ;SET LOOP ON ERROR POINTER TO 18$
2557  032540  012737  030340  177776              MOV     #030340,PSW     ;MAKE PREVIOUS MODE USER
2558  032546  012700  125252                      MOV     #125252,R0      ;LOAD TEST DATA INTO R0
2559  032552  012737  100000  001202              MOV     #100000,$TMP2   ;LOAD VIRT. ADDR. OF TEST LOCATION
2560                                                                      ;INTO LOCATION $TMP2
2561  032560  012702  001202                      MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
2562  032564  010046                      18$:    MOV     R0,-(KSP)       ;PUSH TEST DATA ON KERNEL STACK
2563  032566  105037  172310                      CLRB    KIPDR4          ;MAKE KERNEL PAGE 4 NON-RESIDENT
2564  032572  006672  000000                      MTPI    @0(R2)          ;LOAD TEST DATA INTO PHYSICAL 60000
2565  032576  112737  000006  172310              MOVB    #006,KIPDR4     ;MAKE KERNEL PAGE 4 RESIDENT
2566  032604  013701  100000                      MOV     @#100000,R1     ;READ FROM ADDRESS 60000
2567  032610  020001                              CMP     R0,R1           ;SEE IF DATA WAS STORED CORRECTLY
2568  032612  001401                              BEQ     19$             ;BRANCH IF STORE WAS CORRECT
2569  032614  104047                              ERROR   47              ;INCORRECT STORE
2570                                                                      ;FOR TIGHTER SCOPE LOOP
2571                                                                      ;REPLACE ERROR CALL WITH
2572                                                                      ;'BR 18$'' = 000763
2573  032616  012737  032024  001110  19$:         MOV     #1$,$LPERR      ;SET LOOP POINTER TO START OF TEST
2574  032624  012737  002150  000250              MOV     #MGMERR,MMVEC   ;RESTORE M.M. VECTOR TO NORMAL ROUTINE
2575  032632  000423                              BR      TST45           ;;BRANCH TO NEXT TEST
2576
2577
2578  032634  012637  001266          20$:        MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
2579  032640  012637  001270                      MOV     (KSP)+,TRAPPS
2580  032644  013737  177572  001272              MOV     SR0,WASSR0      ;SAVE SR0 FOR ERROR TYPEOUT
2581  032652  013737  177576  001274              MOV     SR2,WASSR2      ;SAVE SR2 FOR ERROR TYPEOUT
2582  032660  042737  160000  177572              BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
2583  032666  104051                              ERROR   51              ;TRIED TO LOAD A N.R. PAGE 4
2584                                                                      ;FOR TIGHTER SCOPE LOOP
2585                                                                      ;REPLACE ERROR CALL WITH
2586                                                                      ;A 'NOP'' = 000240
2587  032670  013746  001270                      MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
2588  032674  013746  001266                      MOV     TRAPPC,-(KSP)
2589  032700  000002                              RTI                     ;RETURN TO TEST
2590
2591
```

```
                                ;;*****************************************************************
                                ;*TEST 45       MOVE FROM PREVIOUS (KERNEL) I-SPACE TO USER MODE
                                ;*
                                ;*      THIS TEST CHECKS THAT IF THE PREVIOUS MODE IS KERNEL THE
                                ;*      FETCH IS FROM KERNEL SPACE.
                                ;*      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 21$, WHERE THE ERRORS ARE REPORTED.
                                ;*
                                ;;*****************************************************************
032702  000004                  TST45:  SCOPE
032704  012700  077406          1$:     MOV     #77406,R0       ;MAKE ALL USER I-SPACE PAGES RESIDENT
                                                                ;READ/WRITE, LENGTH 200 BLOCKS
032710  012702  000010                  MOV     #10,R2          ;SET LOOP COUNTER TO 8
032714  012701  177600                  MOV     #UIPDR0,R1      ;LOAD ADDRESS OF FIRST PDR IN R1
032720  010021                  2$:     MOV     R0,(R1)+        ;LOAD PDR WITH 77406
032722  077202                          SOB     R2,2$           ;LOOP UNTIL 8 USER PDRS LOADED
032724  012737  032732  001110        MOV     #3$,$LPERR      ;SET LOOP ON ERROR TO 3$
032732  012737  140340  177776  3$:     MOV     #140340,PSW     ;GO TO USER MODE FOR THIS TEST
032740  012737  077406  172310        MOV     #77406,KIPDR4   ;KERNEL I-SPACE PAGE 4 READ/WRITE
032746  012737  000600  172350        MOV     #600,KIPAR4     ;MAP KERNEL I PAGE 4 TO 12K
032754  012737  000600  177650        MOV     #600,UIPAR4     ;MAP USER I PAGE 4 TO 12K
032762  012700  036514                MOV     #36514,R0       ;LOAD DATA PATTERN INTO R0
032766  010037  100000                MOV     R0,@#100000     ;LOAD DATA PATTERN INTO PHY 60000
032772  012702  100000                MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
                                ;THE FOLLOWING WILL TEST DSTM=0 MFPI
                                ;
032776  012737  033400  000250        MOV     #21$,MMVEC      ;SET M.M. VECTOR TO 21$
033004  105037  177610                CLRB    UIPDR4          ;MAKE USER I-SPACE PAGE 4 NON-RESIDENT
033010  012737  140340  177776        MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
033016  006506                  4$:     MFPI    KSP             ;PUT KERNEL STACK POINTER ON USER STACK
033020  022706  000700                  CMP     #USESTK,USP     ;WAS SOMETHING PUSHED ON STACK AT 1$
033024  001407                          BEQ     5$              ;BRANCH IF NOTHING WAS PUSHED
033026  012600                          MOV     (USP)+,R0       ;POP USER STACK INTO R0
033030  012701  001100                  MOV     #KERSTK,R1      ;EXPECTING 1100 AS KSP
033034  020001                          CMP     R0,R1           ;DID YOU GET THE RIGHT POINTER?
033036  001403                          BEQ     6$              ;BRANCH IF YOU DID
033040  104046                          ERROR   46              ;WRONG THING WAS PUSHED ON STACK
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;'BR 4$'' = 000766
033042  000401                          BR      6$              ;BRANCH TO NEXT TRY
033044  104050                  5$:     ERROR   50              ;NOTHING PUSHED ON STACK
                                                                ;FOR TIGHTER SCOPE LOOP
                                                                ;REPLACE ERROR CALL WITH
                                                                ;'BR 4$'' = 000764
033046                          6$:     ;THE FOLLOWING WILL TEST DSTM=1 MFPI.
033046  012737  033054  001110        MOV     #7$,$LPERR      ;SET LOOP ON ERROR POINTER TO 7$
033054  012737  140340  177776  7$:     MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
033062  012700  036514                MOV     #36514,R0       ;LOAD DATA EXPECTED INTO R0
033066  012702  100000                MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
033072  006512                        MFPI    (R2)            ;READ FROM PHYSICAL 60000
033074  012601                        MOV     (USP)+,R1       ;POP USER STACK INTO R1
```

```
2647  033076  020001                        CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
2648  033100  001401                        BEQ     8$              ;BRANCH IF CORRECT DATA WAS FETCHED
2649  033102  104046                        ERROR   46              ;WRONG DATA WAS FETCHED
2650                                                                ;FOR TIGHTER SCOPE LOOP
2651                                                                ;REPLACE ERROR CALL WITH
2652                                                                ;'BR 7$'' = 000764
2653  033104                          8$:   ;THE FOLLOWING WILL TEST DSM=2 MFPI.
2654  033104  012737  033112  001110        MOV     #9$,$LPERR      ;SET LOOP ON ERROR POINTER TO 9$
2655  033112  012737  140340  177776  9$:   MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
2656  033120  012702  100000                MOV     #100000,R2      ;LOAD VIRTUAL ADDRESS INTO R2
2657  033124  006522                        MFPI    (R2)+           ;READ FROM PHYSICAL 60000
2658  033126  012601                        MOV     (USP)+,R1       ;POP USER STACK INTO R1
2659  033130  020001                        CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
2660  033132  001401                        BEQ     10$             ;BRANCH IF CORRECT DATA WAS FETCHED
2661  033134  104046                        ERROR   46              ;WRONG DATA WAS FETCHED
2662                                                                ;FOR TIGHTER SCOPE LOOP
2663                                                                ;REPLACE ERROR CALL WITH
2664                                                                ;'BR 9$'' = 000766
2665  033136                          10$:  ;THE FOLLOWING WILL TEST DSTM=3 MFPI.
2666  033136  012737  033144  001110        MOV     #11$,$LPERR     ;SET LOOP ON ERROR POINTER TO 11$
2667  033144  012737  140340  177776  11$:  MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
2668  033152  006537  100000                MFPI    @#100000        ;READ FROM PHYSICAL 60000
2669  033156  012601                        MOV     (USP)+,R1       ;POP USER STACK INTO R1
2670  033160  020001                        CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
2671  033162  001401                        BEQ     12$             ;BRANCH IF CORRECT DATA WAS FETCHED
2672  033164  104046                        ERROR   46              ;WRONG DATA WAS FETCHED
2673                                                                ;FOR TIGHTER SCOPE LOOP
2674                                                                ;REPLACE ERROR CALL WITH
2675                                                                ;'BR 11$'' = 000767
2676  033166                          12$:  ;THE FOLLOWING WILL TEST DSTM=4 MFPI.
2677  033166  012737  033174  001110        MOV     #13$,$LPERR     ;SET LOOP ON ERROR POINTER TO 13$
2678  033174  012737  140340  177776  13$:  MOV     #140340,PSW     ;MAKE PREVIOUS MODE DERNEL PRESENT USER
2679  033202  012702  100002                MOV     #100002,R2      ;LOAD VIRTUAL ADDRESS INTO R2
2680  033206  006542                        MFPI    -(R2)           ;READ FROM PHYSICAL 60000
2681  033210  012601                        MOV     (USP)+,R1       ;POP USER STACK INTO R1
2682  033212  020001                        CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
2683  033214  001401                        BEQ     14$             ;BRANCH IF CORRECT DATA WAS FETCHED
2684  033216  104046                        ERROR   46              ;WRONG DATA WAS FETCHED
2685                                                                ;FOR TIGHTER SCOPE LOOP
2686                                                                ;REPLACE ERROR CALL WITH
2687                                                                ;'BR 13$'' = 000766
2688  033220                          14$:  ;THE FOLLOWING WILL TEST DSTM=5 MFPI.
2689                                        ;
2690  033220  012737  033226  001110        MOV     #15$,$LPERR     ;SET LOOP ON ERROR POINTER TO 15$
2691  033226  012737  140340  177776  15$:  MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
2692  033234  012737  100000  001202        MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR INTO LOC. $TMP2
2693  033242  012702  001204                MOV     #<$TMP2+2>,R2   ;LOAD ADDRESS OF $TMP2+2 INTO R2
2694  033246  006552                        MFPI    @-(R2)          ;READ FROM PHYSICAL 60000
2695  033250  012601                        MOV     (USP)+,R1       ;POP USER STACK INTO R1
2696  033252  020001                        CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
2697  033254  001401                        BEQ     16$             ;BRANCH IF CORRECT DATA FETCHED
2698  033256  104046                        ERROR   46              ;WRONG DATA WAS FETCHED
2699                                                                ;FOR TIGHTER SCOPE LOOP
2700                                                                ;REPLACE ERROR CALL WITH
2701                                                                ;'BR 15$'' = 000763
2702  033260                          16$:  ;THE FOLLOWING WILL TEST DSTM=6 MFPI.
```

```
2703
2704  033260  012737  033266  001110          MOV     #17$,$LPERR     ;SET LOOP ON ERROR POINTER TO 17$.
2705  033266  012737  140340  177776  17$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
2706  033274  005002                          CLR     R2              ;MAKE REGISTER 2 A ZERO
2707  033276  006562  100000                  MFPI    100000(R2)      ;READ FROM PHYSICAL 60000
2708  033302  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
2709  033304  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
2710  033306  001401                          BEQ     18$             ;BRANCH IF CORRECT DATA FETCHED
2711  033310  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
2712                                                                  ;FOR TIGHTER SCOPE LOOP
2713                                                                  ;REPLACE ERROR CALL WITH
2714                                                                  ;'BR 17$'' = 000766
2715  033312                          18$:    ;THE FOLLOWING WILL TEST DSTM=7 MFPI.
2716                                          ;
2717  033312  012737  033320  001110          MOV     #19$,$LPERR     ;SET LOOP ON ERROR POINTER TO 19$
2718  033320  012737  140340  177776  19$:    MOV     #140340,PSW     ;MAKE PREVIOUS MODE KERNEL PRESENT USER
2719  033326  012737  100000  001202          MOV     #100000,$TMP2   ;LOAD TEST LOC. VIRT. ADDR. INTO $TMP2
2720  033334  012702  001202                  MOV     #$TMP2,R2       ;LOAD ADDRESS OF $TMP2 INTO R2
2721  033340  006572  000000                  MFPI    @0(R2)          ;READ FROM PHYSICAL 60000
2722  033344  012601                          MOV     (USP)+,R1       ;POP USER STACK INTO R1
2723  033346  020001                          CMP     R0,R1           ;WAS DATA FETCHED SAME AS STORED
2724  033350  001401                          BEQ     20$             ;BRANCH IF CORRECT DATA FETCHED
2725  033352  104046                          ERROR   46              ;WRONG DATA WAS FETCHED
2726                                                                  ;FOR TIGHTER SCOPE LOOP
2727                                                                  ;REPLACE ERROR CALL WITH
2728                                                                  ;'BR 19$'' = 000762
2729  033354  012737  002150  000250  20$:    MOV     #MGMERR,MMVEC   ;SET M.M. VECTOR TO NORMAL ROUTINE
2730  033362  012737  000340  177776          MOV     #00340,PSW      ;GO BACK TO KERNEL MODE, PREVIOUS KERNEL
2731  033370  012737  032704  001110          MOV     #1$,$LPERR      ;SET LOOP POINTER TO START OF TEST
2732  033376  000423                          BR      TST46           ;;BRANCH TO NEXT TEXT
2733
2734
2735  033400  012637  001266          21$:    MOV     (KSP)+,TRAPPC   ;SAVE PC & PS OF TRAP
2736  033404  012637  001270                  MOV     (KSP)+,TRAPPS
2737  033410  013737  177572  001272          MOV     SR0,WASSR0      ;SAVE SR0 FOR ERROR TYPEOUT
2738  033416  013737  177576  001274          MOV     SR2,WASSR2      ;SAVE SR2 FOR ERROR TYPEOUT
2739  033424  042737  160000  177572          BIC     #160000,SR0     ;CLEAR ERROR BITS IN SR0
2740  033432  104051                          ERROR   51              ;TRIED TO READ NON-RESIDENT PAGE
2741                                                                  ;FOR TIGHTER SCOPE LOOP
2742                                                                  ;REPLACE ERROR CALL WITH
2743                                                                  ;A 'NOP'' = 000240
2744  033434  013746  001270                  MOV     TRAPPS,-(KSP)   ;PUT PC & PS OF TRAP ON STACK
2745  033440  013746  001266                  MOV     TRAPPC,-(KSP)
2746  033444  000002                          RTI                     ;RETURN TO TEST
2747
2755                                  ;;**************************************************************
 (3)                                  ;*TEST 46       MOVE FROM/TO D-SPACE = MOVE FROM/TO I-SPACE
 (4)                                  ;*
 (4)                                  ;*      THIS TEST CHECKS THAT SINCE THERE IS NO DISTINCTION
 (4)                                  ;*      BETWEEN INSTRUCTION AND DATA SPACE IN THE FONZ-11
 (4)                                  ;*      MFPD & MTPD SHOULD BE DECODED THE SAME AS MFPI & MTPI.
 (4)                                  ;*
 (3)                                  ;;**************************************************************
 (2)  033446  000004                  TST46:  SCOPE
2756  033450  012737  030340  177776  1$:     MOV     #030340,PSW     ;MAKE PREVIOUS MODE=USER,CURRENT=KERNEL
2757  033456  106506                          MFPD    USP             ;MFPD SHOULD ACT LIKE MFPI PUTTING
```

```
2758
2759  033460  022706  001100                CMP     #KERSTK,KSP     ;USER STACK POINTER ON THE KERNEL STACK
2760  033464  001407                        BEQ     2$              ;WAS SOMETHING PUSHED ON KERNEL STACK?
2761  033466  012600                        MOV     (KSP)+,R0       ;BRANCH IF NO
2762  033470  012701  000700                MOV     #USESTK,R1      ;POP KERNEL STACK INTO R0
2763  033474  020001                        CMP     R0,R1           ;EXPECTING TO GET 700 AS USP
2764  033476  001403                        BEQ     3$              ;DID GET RIGHT POINTER VALUE?
2765  033500  104053                        ERROR   53              ;BRANCH IF YES
2766                                                                ;WRONG THING WAS PUSHED ON STACK
2767                                                                ;FOR TIGHTER SCOPE LOOP
2768                                                                ;REPLACE ERROR CALL WITH
2769  033502  000401                        BR      3$              ;'BR 1$'' = 000763
2770  033504  104054                2$:     ERROR   54              ;BRANCH TO NEXT TRY
2771                                                                ;NOTHING PUSHED ON STACK
2772                                                                ;FOR TIGHTER SCOPE LOOP
2773                                                                ;REPLACE ERROR CALL WITH
2774  033506  012737  033514  001110  3$:     MOV     #4$,$LPERR      ;'BR 1$'' = 000761
2775  033514  012746  007777        4$:     MOV     #7777,-(KSP)    ;SET LOOP ON ERROR POINTER TO 4$
2776  033520  106606                        MTPD    USP             ;PUSH DATA ON KERNEL STACK
2777  033522  106506                        MFPD    USP             ;LOAD THE USER STACK POINTER
2778  033524  012601                        MOV     (KSP)+,R1       ;READ USER STACK POINTER
2779  033526  022701  007777                CMP     #7777,R1        ;POP KERNEL STACK INTO R1
2780  033532  001401                        BEQ     5$              ;WAS USER STACK POINTER CHANGED?
2781  033534  104054                        ERROR   54              ;BRANCH IF YES
2782                                                                ;USER STACK POINTER NOT CHANGED
2783                                                                ;FOR TIGHTER SCOPE LOOP
2784                                                                ;REPLACE ERROR CALL WITH
2785  033536  012746  000700        5$:     MOV     #USESTK,-(KSP)  ;'BR 4$'' = 000767
2786  033542  106606                        MTPD    USP             ;GET READY TO RESTORE USER STK. PTR.
2787  033544  012737  033450  001110        MOV     #1$,$LPERR      ;RESTORE USER STACK POINTER
2788                                                                ;SET LOOP POINTER TO START OF TEST
2797                                ;;**************************************************************************
 (3)                                ;*TEST 47       MOVE FROM PREVIOUS I=SPACE (PREVIOUS=CURRENT=KERNEL)
 (4)                                ;*
 (4)                                ;*      THIS TEST CHECKS THAT IF BOTH PREVIOUS AND CURRENT MODES
 (4)                                ;*      ARE KERNEL, AND THE SOURCE MODE IS 0, THE DESTINATION
 (4)                                ;*      STACK IS NOT DECREMENTED BEFORE ACCESS.
 (4)                                ;*      'MFPI KSP'' SHOULD PUSH THE NON-DECREMENTED VALUE
 (4)                                ;*      OF KSP (1100) ONTO THE STACK (AT LOC. 1076).
 (3)                                ;;**************************************************************************
 (2)  033552  000004                TST47:  SCOPE
2798  033554  005037  177776        1$:     CLR     @#PSW           ;SET PREVIOUS = CURRENT = KERNEL
2799  033560  012700  001100                MOV     #STACK,R0       ;SETUP VALUE FOR STACK POINTER
2800  033564  010006                        MOV     R0,KSP          ;LOAD STACK POINTER
2801  033566  006506                        MFPI    KSP             ;THE VALUE 'STACK'' SHOULD BE PUSHED
2802                                                                ;BEFORE BEING DECREMENTED
2803  033570  011601                        MOV     (KSP),R1        ;READ DATA WHICH WAS PUSHED
2804  033572  020001                        CMP     R0,R1           ;WAS THE ORIGINAL VALUE OF THE
2805                                                                ;STACK POINTER PUSHED?
2806  033574  001401                        BEQ     2$              ;BRANCH IF YES
2807  033576  104046                        ERROR   46              ;MFPI FETCHED WRONG DATA
2808                                                                ;FOR TIGHTER SCOPE LOOP
2809                                                                ;REPLACE ERROR CALL WITH
2810                                                                ;'BR 1$'' = 000766
2811  033600  005740                2$:     TST     -(R0)           ;SETUP EXPECTED STACK POINTER VALUE
2812  033602  020600                        CMP     KSP,R0          ;WAS THE STACK POINTER DECREMENTED?
```

```
 2813  033604  001401                    BEQ     3$              ;BRANCH IF YES
 2814  033606  104050                    ERROR   50              ;STACK NOT PUSHED BY THE MFPI
 2815                                                            ;FOR TIGHTER SCOPE LOOP
 2816                                                            ;REPLACE ERROR CALL WITH
 2817                                                            ;'BR 1$' = 000762
 2818  033610  012706  001100      3$:     MOV     #STACK,KSP      ;RESTORE STACK POINTER
```

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

033614                  $EOP:
033614  000004                  SCOPE
033616  005037  001102          CLR     $TSTNM          ;;ZERO THE TEST NUMBER
033622  005037  001212          CLR     $TIMES          ;;ZERO THE NUMBER OF ITERATIONS
033626  005237  001234          INC     $PASS           ;;INCREMENT THE PASS NUMBER
033632  042737  100000  001234  BIC     #100000,$PASS   ;;DON'T ALLOW A NEG. NUMBER
033640  005327                  DEC     (PC)+           ;;LOOP?
033642  000001          $EOPCT: .WORD   1
033644  003110                  BGT     $DOAGN          ;;YES
033646  012737                  MOV     (PC)+,@(PC)+    ;;RESTORE COUNTER
033650  000001          $ENDCT: .WORD   1
033652  033642                  $EOPCT
033654  104401  033662          TYPE    ,65$            ;;TYPE ASCIZ STRING
033660  000407                  BR      64$             ;;GET OVER THE ASCIZ
033662  006412  047105  020104  65$:    .ASCIZ  <12><15>/END PASS #/
033670  040520  051523  021440
033676     000
033700                  .EVEN
033700          64$:
033700  013746  001234          MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
                                                        ;;TYPE PASS NUMBER
033704  104405                  TYPDS                   ;;GO TYPE--DECIMAL ASCIZ WITH SIGN
033706  104401  033714          TYPE    ,67$            ;;TYPE ASCII STRING
033712  000425                  BR      66$             ;;GET OVER THE ASCIZ
033714  035411  047524  040524  67$:    .ASCIZ  /       ;TOTAL ERRORS SINCE LAST START AT 200  /
033722  020114  051105  047522
033730  051522  051440  047111
033736  042503  046040  051501
033744  020124  052123  051101
033752  020124  052101  031040
033760  030060  020040     000
033766                  .EVEN
033766          66$:
033766  013746  001112          MOV     $ERTTL,-(SP)    ;;SAVE $ERTTL FOR TYPEOUT
                                                        ;;TOTAL NUMBER OF ERRORS
033772  104405                  TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
033774  104401  001223          TYPE    ,$CRLF          ;;TYPE CARRIAGE RETURN, LINE FEED
034000  013700  000042  $GET42: MOV     @#42,R0         ;;GET MONITOR ADDRESS
034004  001411                  BEQ     DOAGIN          ;;BRANCH IF NO MONITOR
034006  005046                  CLR     -(SP)           ;;INSURE THE 'T' BIT IS CLEAR
034010  012746  034016          MOV     #$CLR.T,-(SP)   ;;SETUP FOR AN RTI OR RTT
034014  000442                  BR      $RTRN           ;;GO DO AN RTI OR RTT TO LOAD THE PSW
                                                        ;;WITH A CLEARED 'T' BIT
034016  000005          $CLR.T: RESET                   ;;CLEAR THE WORLD
034020  004710          $ENDAD: JSR     PC,(R0)         ;;GO TO MONITOR
```

```
 2868  034022  000240                          NOP                     ;;SAVE ROOM
 2869  034024  000240                          NOP                     ;;FOR
 2870  034026  000240                          NOP                     ;;ACT11
 2871
 2872  034030  013737  000004  001176  DOAGIN: MOV     @#4,@#$TMP0     ;SAVE CONTENTS OF LOCATION 4
 2873  034036  012737  034054  000004          MOV     #1$,@#4         ;SET UP VECTOR IN CASE OF TRAP
 2874  034044  012737  000001  164000          MOV     #1,@#164000     ;NOTIFY MULTI-TESTER OF PASS COMPLETE
 2875  034052  000402                          BR      2$              ;IF NO TRAP DON'T TOUCH STACK
 2876  034054  062706  000004          1$:     ADD     #4,SP           ;RESET STACK IN CASE OF TRAP
 2877  034060  013737  001176  000004  2$:     MOV     @#$TMP0,@#4     ;RESTORE CONTENTS OF LOACTION 4
 2878  034066                          $DOAGN:
 2879  034066  104400                          TRAP                    ;;PUSH OLD PSW AND PC ON STACK
 2880  034070  042716  000020                  BIC     #20,(SP)        ;;CLEAR THE 'T' BIT
 2881  034074  032777  010000  145036          BIT     #BIT12,@SWR     ;;RUN WITH TRACE TRAP?
 2882  034102  001005                          BNE     1$              ;;BR IF NO
 2883  034104  005137  034130                  COM     $TBIT           ;;IS IT TIME FOR TRACE TRAP
 2884  034110  100402                          BMI     1$              ;;BR IF NO
 2885  034112  052716  000020                  BIS     #20,(SP)        ;;SET TRACE TRAP
 2886  034116  012746  034124          1$:     MOV     #$LOOP,-(SP)    ;;JUMP TO START OF TEST
 2887  034122  000002                  $RTRN:  RTI                     ;;RETURN--THIS IS CHANGED TO
 2888                                                                  ;;AN 'RTT' IF 'RTT' IS A LEGAL
 2889                                                                  ;;INSTRUCTION
 2890  034124                          $LOOP:
 2891  034124  000137                          JMP     @(PC)+          ;;RETURN
 2892  034126  020464                  $RTNAD: .WORD   RESTRT
 2893  034130  000000                  $TBIT:  .WORD   0               ;;'T' BIT STATE INDICATOR
 2894  034132     377       377       000    $ENULL: .BYTE   -1,-1,0         ;;NULL CHARACTER STRING
 2895           034136                          .EVEN
 2896                                  .SBTTL  SCOPE HANDLER ROUTINE
  (1)
  (2)                                 ;;**********************************************************************
  (1)                                 ;*THIS ROUTINE CONTROLS THE LOOPING OF SUBTESTS. IT WILL INCREMENT
  (1)                                 ;*AND LOAD THE TEST NUMBER($TSTNM) INTO THE DISPLAY REG.(DISPLAY<7:0>)
  (1)                                 ;*AND LOAD THE ERROR FLAG ($ERFLG) INTO DISPLAY<15:08>
  (1)                                 ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
  (1)                                 ;*SW14=1        LOOP ON TEST
  (1)                                 ;*SW11=1        INHIBIT ITERATIONS
  (1)                                 ;*SW09=1        LOOP ON ERROR
  (1)                                 ;*SW08=1        LOOP ON TEST IN SWR<7:0>
  (1)                                 ;*CALL
  (1)                                 ;*      SCOPE           ;;SCOPE=IOT
  (1)
  (1)   034136                        $SCOPE:
  (1)   034136  104410                          CKSWR                   ;;TEST  FOR CHANGE IN SOFT-SWR
  (1)   034140  032777  040000  144772  1$:     BIT     #BIT14,@SWR     ;;LOOP ON PRESENT TEST?
  (1)   034146  001114                          BNE     $OVER           ;;YES IF SW14=1
  (1)                                 ;#####START OF CODE FOR THE XOR TESTER######
  (1)   034150  000416                  $XTSTR: BR      6$              ;;IF RUNNING ON THE 'XOR' TESTER CHANGE
  (1)                                                                   ;;THIS INSTRUCTION TO A 'NOP' (NOP=240)
  (1)   034152  013746  000004                  MOV     @#ERRVEC,-(SP)  ;;SAVE THE CONTENTS OF THE ERROR VECTOR
  (1)   034156  012737  034176  000004          MOV     #5$,@#ERRVEC    ;;SET FOR TIMEOUT
  (1)   034164  005737  177060                  TST     @#177060        ;;TIME OUT ON XOR?
  (1)   034170  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
  (1)   034174  000463                          BR      $SVLAD          ;;GO TO THE NEXT TEST
  (1)   034176  022626                  5$:     CMP     (SP)+,(SP)+     ;;CLEAR THE STACK AFTER A TIME OUT
  (1)   034200  012637  000004                  MOV     (SP)+,@#ERRVEC  ;;RESTORE THE ERROR VECTOR
```

```
(1)  034204  000423                          BR      7$              ;;LOOP ON THE PRESENT TEST
(1)  034206                          6$:;#####END OF CODE FOR THE XOR TESTER#####
(1)  034206  032777  000400  144724          BIT     #BIT08,@SWR     ;;LOOP ON SPEC. TEST?
(1)  034214  001404                          BEQ     2$              ;;BR IF NO
(1)  034216  127737  144716  001102          CMPB    @SWR,$TSTNM     ;;ON THE RIGHT TEST?    SWR<7:0>
(1)  034224  001465                          BEQ     $OVER           ;;BR IF YES
(1)  034226  105737  001103          2$:     TSTB    $ERFLG          ;;HAS AN ERROR OCCURRED?
(1)  034232  001421                          BEQ     3$              ;;BR IF NO
(1)  034234  123737  001115  001103          CMPB    $ERMAX,$ERFLG   ;;MAX. ERRORS FOR THIS TEST OCCURRED?
(1)  034242  101015                          BHI     3$              ;;BR IF NO
(1)  034244  032777  001000  144666          BIT     #BIT09,@SWR     ;;LOOP ON ERROR?
(1)  034252  001404                          BEQ     4$              ;;BR IF NO
(1)  034254  013737  001110  001106  7$:     MOV     $LPERR,$LPADR   ;;SET LOOP ADDRESS TO LAST SCOPE
(1)  034262  000446                          BR      $OVER
(1)  034264  105037  001103          4$:     CLRB    $ERFLG          ;;ZERO THE ERROR FLAG
(1)  034270  005037  001212                  CLR     $TIMES          ;;CLEAR THE NUMBER OF ITERATIONS TO MAKE
(1)  034274  000415                          BR      1$              ;;ESCAPE TO THE NEXT TEST
(1)  034276  032777  004000  144634  3$:     BIT     #BIT11,@SWR     ;;INHIBIT ITERATIONS?
(1)  034304  001011                          BNE     1$              ;;BR IF YES
(1)  034306  005737  001234                  TST     $PASS           ;;IF FIRST PASS OF PROGRAM
(1)  034312  001406                          BEQ     1$              ;;      INHIBIT ITERATIONS
(1)  034314  005237  001104                  INC     $ICNT           ;;INCREMENT ITERATION COUNT
(1)  034320  023737  001212  001104          CMP     $TIMES,$ICNT    ;;CHECK    NUMBER OF ITERATIONS MADE
(1)  034326  002024                          BGE     $OVER           ;;BR IF MORE ITERATION REQUIRED
(1)  034330  012737  000001  001104  1$:     MOV     #1,$ICNT        ;;REINITIALIZE THE ITERATION COUNTER
(1)  034336  013737  034414  001212          MOV     $MXCNT,$TIMES   ;;SET NUMBER OF ITERATIONS TO DO
(1)  034344  105237  001102          $SVLAD: INCB    $TSTNM          ;;COUNT TEST NUMBERS
(1)  034350  113737  001102  001232          MOVB    $TSTNM,$TESTN   ;;SET TEST NUMBER IN APT MAILBOX
(1)  034356  011637  001106                  MOV     (SP),$LPADR     ;;SAVE SCOPE LOOP ADDRESS
(1)  034362  011637  001110                  MOV     (SP),$LPERR     ;;SAVE ERROR LOOP ADDRESS
(1)  034366  005037  001214                  CLR     $ESCAPE         ;;CLEAR THE ESCAPE FROM ERROR ADDRESS
(1)  034372  112737  000001  001115          MOVB    #1,$ERMAX       ;;ONLY ALLOW ONE(1) ERROR ON NEXT TEST
(1)  034400  013777  001102  144534  $OVER:  MOV     $TSTNM,@DISPLAY ;;DISPLAY TEST NUMBER
(1)  034406  013716  001106                  MOV     $LPADR,(SP)     ;;FUDGE RETURN ADDRESS
(1)  034412  000002                          RTI                     ;;FIXES PS
(1)  034414  000200                  $MXCNT: 200                     ;;MAX. NUMBER OF ITERATIONS
2897                                 .SBTTL  ERROR HANDLER ROUTINE
 (1)
 (2)                                 ;;**********************************************************************
 (1)                                 ;*THIS ROUTINE WILL INCREMENT THE ERROR FLAG AND THE ERROR COUNT,
 (1)                                 ;*SAVE THE ERROR ITEM NUMBER AND THE ADDRESS OF THE ERROR CALL
 (1)                                 ;*AND GO TO ERRTYP ON ERROR
 (1)                                 ;*THE SWITCH OPTIONS PROVIDED BY THIS ROUTINE ARE:
 (1)                                 ;*SW15=1        HALT ON ERROR
 (1)                                 ;*SW13=1        INHIBIT ERROR TYPEOUTS
 (1)                                 ;*SW10=1        BELL ON ERROR
 (1)                                 ;*SW09=1        LOOP ON ERROR
 (1)                                 ;*CALL
 (1)                                 ;*      ERROR   N       ;;ERROR=EMT AND N=ERROR ITEM NUMBER
 (1)
(1)  034416                          $ERROR:
(1)  034416  104410                          CKSWR                   ;;TEST FOR CHANGE IN SOFT-SWR
(3)  034420  010037  001162                  MOV     R0,$REG0        ;SAVE THE CONTENTS OF R0
(3)  034424  010137  001164                  MOV     R1,$REG1        ;SAVE THE CONTENTS OF R1
(3)  034430  010237  001166                  MOV     R2,$REG2        ;SAVE THE CONTENTS OF R2
(3)  034434  010337  001170                  MOV     R3,$REG3        ;SAVE THE CONTENTS OF R3
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(3)  034440  010437  001172                    MOV     R4,$REG4          ;SAVE THE CONTENTS OF R4
(3)  034444  010537  001174                    MOV     R5,$REG5          ;SAVE THE CONTENTS OF R5
(3)  034450  113737  001102  001262            MOVB    $TSTNM,TESTNO     ;SAVE THE TEST NUMBER
(1)  034456  105237  001103            7$:     INCB    $ERFLG            ;;SET THE ERROR FLAG
(1)  034462  001775                            BEQ     7$                ;;DON'T LET THE FLAG GO TO ZERO
(1)  034464  013777  001102  144450            MOV     $TSTNM,@DISPLAY   ;;DISPLAY TEST NUMBER AND ERROR FLAG
(1)  034472  032777  002000  144440            BIT     #BIT10,@SWR       ;;BELL ON ERROR?
(1)  034500  001402                            BEQ     1$                ;;NO - SKIP
(1)  034502  104401  001216                    TYPE    ,$BELL            ;;RING BELL
(1)  034506  005237  001112            1$:     INC     $ERTTL            ;;COUNT THE NUMBER OF ERRORS
(1)  034512  011637  001116                    MOV     (SP),$ERRPC       ;;GET ADDRESS OF ERROR INSTRUCTION
(1)  034516  162737  000002  001116            SUB     #2,$ERRPC
(1)  034524  117737  144366  001114            MOVB    @$ERRPC,$ITEMB    ;;STRIP AND SAVE THE ERROR ITEM CODE
(1)  034532  032777  020000  144400            BIT     #BIT13,@SWR       ;;SKIP TYPEOUT IF SET
(1)  034540  001004                            BNE     20$               ;;SKIP TYPEOUTS
(1)  034542  004737  034654                    JSR     PC,ERRTYP         ;;GO TO USER ERROR ROUTINE
(1)  034546  104401  001223                    TYPE    ,$CRLF
(1)  034552                            20$:
(1)  034552  122737  000001  001246            CMPB    #APTENV,$ENV      ;;RUNNING IN APT MODE
(1)  034560  001007                            BNE     2$                ;;NO,SKIP APT ERROR REPORT
(1)  034562  113737  001114  034574            MOVB    $ITEMB,21$        ;;SET ITEM NUMBER AS ERROR NUMBER
(1)  034570  004737  037216                    JSR     PC,$ATY4          ;;REPORT FATAL ERROR TO APT
(1)  034574     000            21$:     .BYTE   0
(1)  034575     000                     .BYTE   0
(1)  034576  000777            22$:     BR      22$               ;;APT ERROR LOOP
(1)  034600  005777  144334            2$:     TST     @SWR              ;;HALT ON ERROR
(1)  034604  100002                            BPL     3$                ;;SKIP IF CONTINUE
(1)  034606  000000                            HALT                      ;;HALT ON ERROR!
(1)  034610  104410                            CKSWR                     ;;TEST FOR CHANGE IN SOFT-SWR
(1)  034612  032777  001000  144320    3$:     BIT     #BIT09,@SWR       ;;LOOP ON ERROR SWITCH SET?
(1)  034620  001402                            BEQ     4$                ;;BR IF NO
(1)  034622  013716  001110                    MOV     $LPERR,(SP)       ;;FUDGE RETURN FOR LOOPING
(1)  034626  005737  001214            4$:     TST     $ESCAPE           ;;CHECK FOR AN ESCAPE ADDRESS
(1)  034632  001402                            BEQ     5$                ;;BR IF NONE
(1)  034634  013716  001214                    MOV     $ESCAPE,(SP)      ;;FUDGE RETURN ADDRESS FOR ESCAPE
(1)  034640                            5$:
(1)  034640  022737  034020  000042            CMP     #$ENDAD,@#42      ;;ACT-11 AUTO-ACCEPT?
(1)  034646  001001                            BNE     6$                ;;BRANCH IF NO
(1)  034650  000000                            HALT                      ;;YES
(1)  034652                            6$:
(1)  034652  000002                            RTI                       ;;RETURN
2898                                    .SBTTL  ERROR MESSAGE TYPEOUT ROUTINE
2899
2900                                    ;;**********************************************************************
2901                                    ;*THIS ROUTINE USES THE ''ITEM CONTROL BYTE'' ($ITEMB) TO DETERMINE WHICH
2902                                    ;*ERROR IS TO BE REPORTED. IT THEN OBTAINS, FROM THE 'ERROR TABLE'' ($ERRTB),
2903                                    ;*AND REPORTS THE APPROPRIATE INFORMATION CONCERNING THE ERROR.
2904                                    ;*
2905                                    ;*NOTES:
2906                                    ;*1)    THIS ROUTINE PROVIDES AN AUTOMATIC ''CARRIAGE RETURN-LINE FEED''
2907                                    ;*      FOR ''EM'', ''DH'', AND ''DT''.
2908                                    ;*2)    TWO SPACES ARE TYPED AFTER EACH NUMBER FOR ''DT''
2909                                    ;*3)    FOR $ITEMB=0, JUST THE ERROR PC IS TYPED
2910                                    ;*4)    THE AVAILABLE FORMATS FOR TYPING DATA ARE:
2911                                    ;*      DF      FORMAT
2912                                    ;*      0       TYPE A 6 DIGIT OCTAL NUMBER (FROM 16-BIT BINARY)
```

```
                        ;*      1       TYPE A DECIMAL NUMBER WITHOUT LEADING ZEROS
                        ;*      2       TYPE A 16 DIGIT BINARY NUMBER
                        ;*      3       TYPE A 6 DIGIT OCTAL NUMBER (FROM 18-BIT BINARY)
                        ;*
                        ERRTYP:
                                TYPE    ,$CRLF          ;''CARRIAGE RETURN'' & 'LINE FEED''
                                MOV     R0,-(SP)        ;SAVE R0
                                CLR     R0              ;PICKUP THE ITEM INDEX
                                BISB    @#$ITEMB,R0
                                BNE     1$              ;IF ITEM NUMBER IS ZERO, JUST
                                                        ;TYPE THE PC OF THE ERROR
                                MOV     $ERRPC,-(SP)    ;;SAVE $ERRPC FOR TYPEOUT
 (1)                                                    ;;ERROR ADDRESS
 (1)                            TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
                                BR      13$             ;GET OUT
                        1$:     DEC     R0              ;ADJUST THE INDEX SO THAT IT WILL
                                ASL     R0              ;       WORK FOR THE ERROR TABLE
                                ASL     R0
                                ASL     R0
                                ADD     #$ERRTB,R0      ;FORM TABLE POINTER
                                MOV     (R0)+,2$        ;PICKUP ''ERROR MESSAGE'' POINTER
                                BEQ     3$              ;SKIP TYPEOUT IF NO POINTER
                                TYPE                    ;TYPE THE ''ERROR MESSAGE''
                        2$:     .WORD   0               ;''ERROR MESSAGE'' POINTER GOES HERE
                                TYPE    ,$CRLF          ;''CARRIAGE RETURN'' & 'LINE FEED''
                        3$:     MOV     (R0)+,4$        ;PICKUP ''DATA HEADER'' POINTER
                                BEQ     5$              ;SKIP TYPEOUT IF 0
                                TYPE                    ;TYPE THE ''DATA HEADER''
                        4$:     .WORD   0               ;''DATA HEADER'' POINTER GOES HERE
                                TYPE    ,$CRLF          ;''CARRIAGE RETURN'' & 'LINE FEED''
                        5$:     MOV     R1,-(SP)        ;SAVE R1
                                MOV     (R0)+,R1        ;PICKUP ''DATA TABLE'' POINTER
                                BEQ     12$             ;BR IF NO DATA TO BE TYPED
                                MOV     (R0)+,R0        ;PICKUP ''DATA FORMAT'' POINTER
                        6$:     TSTB    (R0)            ;IS IT FORMAT 0?
                                BNE     7$              ;BR IF NO

                        ;*THIS CODE IS FOR OCTAL (16-BIT) FORMAT (DF=0)
                                MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
 (1)                            TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
                                BR      11$

                        ;*THIS CODE IS FOR DECIMAL FORMAT (DF=1)
                        7$:     CMPB    (R0),#1         ;IS IT FORMAT 1?
                                BNE     8$              ;BRANCH IF NO
                                MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
 (1)                            TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
                                BR      11$

                        ;*THIS CODE IS FOR BINARY FORMAT (DF=2)
                        8$:     CMPB    (R0),#2         ;IS IT FORMAT 2?
                                BNE     9$              ;BRANCH IF NO
                                MOV     @(R1)+,-(SP)    ;;SAVE @(R1)+ FOR TYPEOUT
 (1)                            TYPBN                   ;;GO TYPE--BINARY ASCII
                                BR      11$
```

```
2964
2965                                        ;*THIS CODE IS FOR OCTAL (18-BIT) FORMAT (DF=3)
2966  035024  012146                9$:     MOV     (R1)+,-(SP)     ;PUT ADDRESS OF FIRST LOC. ON STACK
2967  035026  004737  040270              JSR     PC,$DB2O        ;CONVERT TWO LOCS. TO AN ASCII STRING
2968  035032  062716  000005              ADD     #5,(SP)         ;ONLY NEED 6 CHARACTERS NOT 11
2969  035036  012637  035044              MOV     (SP)+,10$       ;PUT ADDRESS OF ASCII CHARS. AT 10$
2970  035042  104401                      TYPE                    ;TYPE OCTAL VALUE OF 18-BIT BINARY NO.
2971  035044  000000                10$:    .WORD   0
2972
2973  035046  005711                11$:    TST     (R1)            ;IS THERE ANOTHER NUMBER?
2974  035050  001404                      BEQ     12$             ;BR IF NO
2975  035052  104401  035074              TYPE    ,14$            ;TYPE TWO(2) SPACES
2976  035056  105720                      TSTB    (R0)+           ;POINT TO NEW 'DATA FORMAT'
2977  035060  000740                      BR      6$              ;LOOP
2978
2979  035062  012601                12$:    MOV     (SP)+,R1        ;RESTORE R1
2980  035064  012600                13$:    MOV     (SP)+,R0        ;RESTORE R0
2981  035066  104401  001223              TYPE    ,$CRLF          ;'CARRIAGE RETURN' & 'LINE FEED'
2982  035072  000207                      RTS     PC              ;RETURN
2983  035074  020040     000        14$:    .ASCIZ  /  /            ;TWO(2) SPACES
2984            035100                    .EVEN
2985
```

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

                                .SBTTL  TURN OFF T-BIT AND SAVE CURRENT PSW
                                ;;******************************************************************
                                ;*
                                ;*      THIS SUBROUTINE IS USED TO TURN OFF THE TRACE TRAP BIT IN THE PSW
                                ;*      IF IT IS ON.  THE PROCESSOR STATUS IS SAVED IN ''TBITPS'' SO THAT
                                ;*      THE PSW CAN BE RESTORED TO ITS PREVIOUS CONDITION WHEN CONDITIONS
                                ;*      WARRANT T-BIT TRAPPING.
                                ;*
                                ;;******************************************************************
035100  033727  177776  000020  TOFF:   BIT     PSW,#TBIT       ;IS THE T-BIT SET IN THE PSW?
035106  001411                          BEQ     1$              ;EXIT IF NO
035110  013746  177776                  MOV     PSW,-(SP)       ;PUSH PRESENT PSW ON THE STACK
035114  011637  001276                  MOV     (SP),TBITPS     ;ALSO SAVE IT IN ''TBITPS'' FOR
                                                                ;RESTORING LATER
035120  042716  000020                  BIC     #TBIT,(SP)      ;CLEAR THE T-BIT (BIT 4) IN THE PSW
035124  012746  035132                  MOV     #1$,-(SP)       ;PUSH PC OF ''RTS'' ON STACK
035130  000006                          RTT                     ;''RETURN'' TO 1$ WITH T-BIT OFF
035132  000207                  1$:     RTS     PC              ;RETURN TO PROGRAM

                                .SBTTL  TURN ON T-BIT AND RESTORE PREVIOUS PSW
                                ;;******************************************************************
                                ;*
                                ;*      THIS SUBROUTINE IS USED TO RESTORE THE PROCESSOR STATUS TO ITS
                                ;*      PREVIOUS CONDITION BY RESTORING THE ''T-BIT PSW'' SAVED BY THE
                                ;*      ''TOFF'' SUBROUTINE IN THE ''TBITPS'' LOCATION.
                                ;*
                                ;;******************************************************************
035134  033727  001276  000020  TON:    BIT     TBITPS,#TBIT    ;WAS T-BIT ON IN THE PREVIOUS PSW?
035142  001410                          BEQ     1$              ;EXIT IF NO
035144  013746  001276                  MOV     TBITPS,-(SP)    ;PUSH PREVIOUS PSW ON THE STACK
035150  012737  000340  001276          MOV     #340,TBITPS     ;RESET THE ''TBITPS'' LOCATION
035156  012746  035164                  MOV     #1$,-(SP)       ;PUSH PC OF ''RTS'' ON STACK
035162  000006                          RTT                     ;''RETURN'' TO 1$ WITH T-BIT RESTORED
035164  000207                  1$:     RTS     PC              ;RETURN TO PROGRAM

                                .SBTTL  SET ALL WRITEABLE BITS IN ALL PAR/PDR'S
                                ;;******************************************************************
                                ;*
                                ;*      THIS SUBROUTINE IS USED BY THE PAR/PDR DUAL ADDRESSING TEST
                                ;*      TO SET ALL WRITEABLE BITS IN ALL KERNEL AND USE PAR'S AND
                                ;*      PDR'S TO A 1.  THE ''INITIAL STATE'' OF HAVING ALL BITS-1 IS
                                ;*      USED TO SEE THAT ONLY ONE REGISTER IS CLEARED IN RESPONSE TO
                                ;*      A SINGLE PAR OR PDR ADDRESS.
                                ;*
                                ;;******************************************************************
035166  012702  000010  SETREG: MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
035172  012701  172300          MOV     #KIPDR0,R1      ;LOAD ADDRESS OF FIRST PDR INTO R1
035176  012721  177777  1$:     MOV     #-1,(R1)+       ;SET BITS IN KERNEL PDR TO 1
035202  077203                  SOB     R2,1$           ;LOOP TO 1$ UNTIL ALL KERNEL PDR'S LOADED
035204  012702  000010          MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
035210  012701  172340          MOV     #KIPAR0,R1      ;LOAD ADDRESS OF FIRST PAR INTO R1
035214  012721  177777  2$:     MOV     #-1,(R1)+       ;SET BITS IN A KERNEL PAR TO 1
035220  077203                  SOB     R2,2$           ;LOOP TO 2$ UNTIL ALL KERNEL PAR'S LOADED
```

```
3043  035222  012702  000010          MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
3044  035226  012701  177600          MOV     #UIPDR0,R1      ;LOAD ADDRESS OF FIRST PDR INTO R1
3045  035232  012721  177777  3$:     MOV     #-1,(R1)+       ;SET BITS IN A USER PDR TO 1
3046  035236  077203                  SOB     R2,3$           ;LOOP TO 3$ UNTIL ALL USER PDR'S LOADED
3047  035240  012702  000010          MOV     #10,R2          ;LOAD LOOP COUNTER WITH AN 8
3048  035244  012701  177640          MOV     #UIPAR0,R1      ;LOAD ADDRESS OF FIRST PAR INTO R1
3049  035250  012721  177777  4$:     MOV     #-1,(R1)+       ;SET BITS IN A USER PAR TO 1
3050  035254  077203                  SOB     R2,4$           ;LOOP TO 4$ UNTIL ALL USER PAR'S LOADED
3051  035256  000207                  RTS     PC              ;RETURN TO TEST
3052
3053                          .SBTTL  READ & COMPARE KERNEL & USER PAR/PDR'S
3054                          ;;*****************************************************************
3055                          ;*
3056                          ;*      THIS SUBROUTINE IS USED BY PAR/PDR DUAL ADDRESSING TEST TO
3057                          ;*      READ ALL THE PAR'S AND PDR'S TO SEE THAT ONLY ONE REGISTER
3058                          ;*      WAS CLEARED IN RESPONSE TO A SINGLE PAR OR PDR ADDRESS.
3059                          ;*      ANY FAILURES FOUND BY THE PAR/PDR DUAL ADDRESSING TEST WILL
3060                          ;*      BE REPORTED BY THIS SUBROUTINE.
3061                          ;*
3062                          ;;*****************************************************************
3063  035260                  CMPREG:
3064  035260  012701  172300          MOV     #KIPDR0,R1      ;LOAD ADDRESS OF FIRST KERNEL PDR IN R1
3065  035264  012704  000010          MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
3066  035270  012705  077416          MOV     #77416,R5       ;PUT EXPECTED PDR CONTENTS IN R5
3067  035274  021105          1$:     CMP     (R1),R5         ;ARE ALL WRITEABLE BITS SET AS EXPECTED?
3068  035276  001404                  BEQ     2$              ;BRANCH IF YES
3069  035300  020100                  CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
3070  035302  001402                  BEQ     2$              ;BRANCH IF YES
3071  035304  011102                  MOV     (R1),R2         ;SAVE CONTENTS OF IMPROPERLY CLEARED REGISTER
3072  035306  104016                  ERROR   16              ;A PDR WAS EFFECTED BY CLEARING A DIFFERENT PAR/PDR
3073                                                          ;FOR TIGHTER SCOPE LOOP
3074                                                          ;REPLACE ERROR CALL WITH
3075                                                          ;AN 'RTS PC'' = 000207
3076  035310  062701  000002  2$:     ADD     #2,R1           ;FORM NEXT ADDRESS
3077  035314  077411                  SOB     R4,1$           ;LOOP TO 1$ UNTIL ALL KERNEL PDR'S CHECKED
3078  035316  012701  172340          MOV     #KIPAR0,R1      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R1
3079  035322  012704  000010          MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
3080  035326  012705  177777          MOV     #177777,R5      ;PUT EXPECTED PAR CONTENTS IN R5
3081  035332  021105          3$:     CMP     (R1),R5         ;ARE ALL WRITEABLE BITS SET AS EXPECTED?
3082  035334  001404                  BEQ     4$              ;BRANCH IF YES
3083  035336  020100                  CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
3084  035340  001402                  BEQ     4$              ;BRANCH IF YES
3085  035342  011102                  MOV     (R1),R2         ;SAVE CONTENTS OF IMPROPERLY CLEARED REGISTER
3086  035344  104016                  ERROR   16              ;A PAR WAS EFFECTED BY CLEARING A DIFFENENT PAR/PDR
3087                                                          ;FOR TIGHTER SCOPE LOOP
3088                                                          ;REPLACE ERROR CALL WITH
3089                                                          ;AN 'RTS PC'' = 000207
3090  035346  062701  000002  4$:     ADD     #2,R1           ;FORM NEXT ADDRESS
3091  035352  077411                  SOB     R4,3$           ;LOOP TO 3$ UNTIL ALL KERNEL PAR'S CHECKED
3092  035354  012701  177600          MOV     #UIPDR0,R1      ;LOAD ADDRESS OF FIRST USER PDR IN R1
3093  035360  012704  000010          MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
3094  035364  012705  077416          MOV     #77416,R5       ;PUT EXPECTED PDR CONTENTS IN R5
3095  035370  021105          5$:     CMP     (R1),R5         ;ARE ALL WRITEABLE BITS SET AS EXPECTED?
3096  035372  001404                  BEQ     6$              ;BRANCH IF YES
3097  035374  020100                  CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
3098  035376  001402                  BEQ     6$              ;BRANCH IF YES
```

```
3099  035400  011102                    MOV     (R1),R2         ;SAVE CONTENTS OF IMPROPERLY CLEARED REGISTER
3100  035402  104016                    ERROR   16              ;A PDR WAS EFFECTED BY CLEARING A DIFFERENT PAR/PDR
3101                                                            ;FOR TIGHTER SCOPE LOOP
3102                                                            ;REPLACE ERROR CALL WITH
3103                                                            ;AN 'RTS PC'' = 000207
3104  035404  062701  000002          6$:     ADD     #2,R1           ;FORM NEXT ADDRESS
3105  035410  077411                          SOB     R4,5$           ;LOOP TO 5$ UNTIL ALL USER PDR'S CHECKED
3106  035412  012701  177640                  MOV     #UIPAR0,R1      ;LOAD ADDRESS OF FIRST USER PAR IN R1
3107  035416  012704  000010                  MOV     #10,R4          ;LOAD LOOP COUNTER WITH AN 8
3108  035422  012705  177777                  MOV     #177777,R5      ;PUT EXPECTED PAR CONTENTS IN R5
3109  035426  021105                  7$:     CMP     (R1),R5         ;ARE ALL WRITEABLE BITS SET AS EXPECTED?
3110  035430  001404                          BEQ     8$              ;BRANCH IF YES
3111  035432  020100                          CMP     R1,R0           ;WAS IT THE REG. THAT WAS CLEARED?
3112  035434  001402                          BEQ     8$              ;BRANCH IF YES
3113  035436  011102                          MOV     (R1),R2         ;SAVE CONTENTS OF IMPROPERLY CLEARED REGISTER
3114  035440  104016                          ERROR   16              ;A PAR WAS EFFECTED BY CLEARING A DIFFERENT PAR/PDR
3115                                                            ;FOR TIGHTER SCOPE LOOP
3116                                                            ;REPLACE ERROR CALL WITH
3117                                                            ;AN 'RTS PC'' = 000207
3118  035442  062701  000002          8$:     ADD     #2,R1           ;FORM NEXT ADDRESS
3119  035446  077411                          SOB     R4,7$           ;LOOP TO 7$ UNTIL ALL USER PAR'S CHECKED
3120  035450  000207                          RTS     PC              ;RETURN TO TEST
3121
3122                                  .SBTTL  CONVERT VIRTUAL ADDRESS TO PHYSICAL ADDRESS
3123                                  ;;*****************************************************************
3124                                  ;*
3125                                  ;*      THIS SUBROUTINE IS USED TO FORM AN 18-BIT PHYSICAL ADDRESS
3126                                  ;*      (PBA) FROM THE 16-BIT VIRTUAL ADDRESS (VBA) AND THE APPROPRIATE
3127                                  ;*      PAGE ADDRESS REGISTER (PAR).  THE SAME METHOD USED BY THE MEMORY
3128                                  ;*      MANAGEMENT LOGIC IS USED.  VBA <15:13> SELECTS WHICH PAR/PDR
3129                                  ;*      IS TO BE USED, VBA <5:0>+PBA <5:0>, AND VBA <12:6> IS ADDED
3130                                  ;*      TO PAR <11:00> TO GIVE PBA <17:6>.  BITS <17:16> OF THE
3131                                  ;*      PHYSICAL ADDRESS ARE LEFT IN LOC. 'PBAHI'' AND BITS <15:00>
3132                                  ;*      ARE LEFT IN LOC. 'PBALO''.  THE PSW'S ''CURRENT MODE'' BITS
3133                                  ;*      ARE USED TO SELECT THE KERNEL OR USER PAR/PDR'S.  THE ROUTINE
3134                                  ;*      IS ENTERED WITH LOC. 'VIRT1'' CONTAINING THE 16-BIT VIRTUAL
3135                                  ;*      ADDRESS.
3136                                  ;*
3137                                  ;;*****************************************************************
3138
3139  035452                          FORMPA:
 (2)  035452  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 (2)  035454  010246                          MOV     R2,-(SP)        ;;PUSH R2 ON STACK
3140  035456  012702  172340                  MOV     #KIPAR0,R2      ;LOAD ADDRESS OF FIRST KERNEL PAR IN R2
3141  035462  032737  140000  177776          BIT     #140000,PSW     ;IN USER MODE?
3142  035470  001402                          BEQ     1$              ;BRANCH IF NO
3143  035472  012702  177640                  MOV     #UIPAR0,R2      ;LOAD ADDRESS OF FIRST USER PAR IN R2
3144  035476  013700  001306          1$:     MOV     VIRT1,R0        ;LOAD VIRTUAL ADDR. (VBA) INTO R0
3145  035502  072027  177764                  ASH     #-14,R0         ;GET BITS <15:13> DOWN TO BITS <3:1>
3146  035506  042700  177761                  BIC     #177761,R0      ;MASK OF ALL BITS BUT BITS <3:1>
3147  035512  060002                          ADD     R0,R2           ;ADD OFFSET TO BASE PAR ADDRESS
3148  035514  011200                          MOV     (R2),R0         ;GET BITS <11:00> FROM APPROPRIATE PAR
3149  035516  010002                          MOV     R0,R2           ;COPY PAR BITS <11:00> INTO R2
3150  035520  013737  001306  001312          MOV     VIRT1,PBALO     ;PUT VIRTUAL ADDR. IN LOC. 'PBALO''
3151  035526  042737  160000  001312          BIC     #160000,PBALO   ;CLEAR OFF BITS <15:13> OF ORIGINAL VBA
3152  035534  072227  177766                  ASH     #-12,R2         ;GET PAR <11:00> DOWN TO BITS <1:0> OF R2
```

```
 3153  035540  042702  177774                BIC     #177774,R2      ;CLEAR OFF ALL BITS BUT BITS <1:0>
 3154  035544  072027  000006                ASH     #6,R0           ;SHIFT PAR<9:0> TO <15:6> OF R0
 3155  035550  042700  000077                BIC     #77,R0          ;CLEAR BITS <5:0> OF R0
 3156  035554  060037  001312                ADD     R0,PBALO        ;IN EFFECT, ADD VBA<12:0> TO PAR<9:0>
 3157                                                                ;(PAR<9:0> IN BITS <15:6> OF R0)
 3158  035560  005502                        ADC     R2              ;ADD ANY CARRY TO R2
 3159  035562  010237  001314                MOV     R2,PBAHI        ;PUT BITS <17:16> OF PHYSICAL ADDR. IN PBAHI
 3160  035566  012602                        MOV     (SP)+,R2        ;;POP STACK INTO R2
   (2) 035570  012600                        MOV     (SP)+,R0        ;;POP STACK INTO R0
 3161  035572  000207                        RTS     PC              ;RETURN TO PROGRAM
 3162
 3163
```

```
 3165                                   .SBTTL  TTY INPUT ROUTINE
  (1)
  (2)                                   ;;*****************************************************************
  (1)                                   .ENABL  LSB
  (1)
  (2)                                   ;;*****************************************************************
  (1)                                   ;*SOFTWARE SWITCH REGISTER CHANGE ROUTINE.
  (1)                                   ;*ROUTINE IS ENTERED FROM THE TRAP HANDLER, AND WILL
  (1)                                   ;*SERVICE THE TEST FOR CHANGE IN SOFTWARE SWITCH REGISTER TRAP CALL
  (1)                                   ;*WHEN OPERATING IN TTY FLAG MODE.
  (1)  035574  022737  000176  001140  $CKSWR: CMP     #SWREG,SWR      ;;IS THE SOFT-SWR SELECTED?
  (1)  035602  001114                         BNE     15$             ;;BRANCH IF NO
  (1)  035604  105777  143334                 TSTB    @$TKS           ;;CHAR THERE?
  (1)  035610  100111                         BPL     15$             ;;IF NO, DON'T WAIT AROUND
  (1)  035612  117746  143330                 MOVB    @$TKB,-(SP)     ;;SAVE THE CHAR
  (1)  035616  042716  177600                 BIC     #^C177,(SP)     ;;STRIP-OFF THE ASCII
  (1)  035622  022726  000007                 CMP     #7,(SP)+        ;;IS IT A CONTROL G?
  (1)  035626  001102                         BNE     15$             ;;NO, RETURN TO USER
  (1)  035630  123727  001134  000001         CMPB    $AUTOB,#1       ;;ARE WE RUNNING IN AUTO-MODE?
  (1)  035636  001476                         BEQ     15$             ;;BRANCH IF YES
  (1)
  (1)  035640  104401  036536                 TYPE    ,$CNTLG         ;;ECHO THE CONTROL-G (^G)
  (1)  035644  104401  036543  $GTSWR: TYPE    ,$MSWR          ;;TYPE CURRENT CONTENTS
  (2)  035650  013746  000176                 MOV     SWREG,-(SP)     ;;SAVE SWREG FOR TYPEOUT
  (2)  035654  104402                         TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
  (1)  035656  104401  036554                 TYPE    ,$MNEW          ;;PROMPT FOR NEW SWR
  (1)  035662  005046                 19$:    CLR     -(SP)           ;;CLEAR COUNTER
  (1)  035664  005046                         CLR     -(SP)           ;;THE NEW SWR
  (1)  035666  105777  143252         7$:     TSTB    @$TKS           ;;CHAR THERE?
  (1)  035672  100375                         BPL     7$              ;;IF NOT TRY AGAIN
  (1)
  (1)  035674  117746  143246                 MOVB    @$TKB,-(SP)     ;;PICK UP CHAR
  (1)  035700  042716  177600                 BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
  (1)
  (1)  035704  021627  000003                 CMP     (SP),#3         ;;IS IT A CONTROL-C?
  (1)  035710  001015                         BNE     9$              ;;BRANCH IF NOT
  (1)  035712  104401  036524                 TYPE    ,$CNTLC         ;;YES, ECHO CONTROL-C (^C)
  (1)  035716  062706  000006                 ADD     #6,SP           ;;CLEAN UP STACK
  (1)  035722  123727  001135  000001         CMPB    $INTAG,#1       ;;REENABLE TTY KEYBOARD INTERRUPTS?
  (1)  035730  001003                         BNE     8$              ;;BRANCH IF NO
  (1)  035732  012777  000100  143204         MOV     #100,@$TKS      ;;ALLOW TTY KEYBOARD INTERRUPTS
  (1)  035740  000137  036566         8$:     JMP     CNTRLC          ;; CONTROL-C RESTART
  (1)
  (1)
  (1)  035744  021627  000025         9$:     CMP     (SP),#25        ;;IS IT A CONTROL-U?
  (1)  035750  001005                         BNE     10$             ;;BRANCH IF NOT
  (1)  035752  104401  036531                 TYPF    ,$CNTLU         ;;YES, ECHO CONTROL-U (^U)
  (1)  035756  062706  000006         20$:    ADD     #6,SP           ;;IGNORE PREVIOUS INPUT
  (1)  035762  000737                         BR      19$             ;;LET'S TRY IT AGAIN
  (1)
  (1)
  (1)  035764  021627  000015         10$:    CMP     (SP),#15        ;;IS IT A <CR>?
  (1)  035770  001022                         BNE     16$             ;;BRANCH IF NO
  (1)  035772  005766  000004                 TST     4(SP)           ;;YES, IS IT THE FIRST CHAR?
  (1)  035776  001403                         BEQ     11$             ;;BRANCH IF YES
  (1)  036000  016677  000002  143132         MOV     2(SP),@SWR      ;;SAVE NEW SWR
```

```
(1)  036006  062706  000006          11$:    ADD     #6,SP           ;;CLEAR UP STACK
(1)  036012  104401  001223          14$:    TYPE    ,$CRLF          ;;ECHO <CR> AND <LF>
(1)  036016  123727  001135  000001          CMPB    $INTAG,#1       ;;RE-ENABLE TTY KBD INTERRUPTS?
(1)  036024  001003                          BNE     15$             ;;BRANCH IF NOT
(1)  036026  012777  000100  143110          MOV     #100,@$TKS      ;;RE-ENABLE TTY KBD INTERRUPTS
(1)  036034  000002                  15$:    RTI                     ;;RETURN
(1)  036036  004737  037130          16$:    JSR     PC,$TYPEC       ;;ECHO CHAR
(1)  036042  021627  000060                  CMP     (SP),#60        ;;CHAR < 0?
(1)  036046  002420                          BLT     18$             ;;BRANCH IF YES
(1)  036050  021627  000067                  CMP     (SP),#67        ;;CHAR > 7?
(1)  036054  003015                          BGT     18$             ;;BRANCH IF YES
(1)  036056  042726  000060                  BIC     #60,(SP)+       ;;STRIP-OFF ASCII
(1)  036062  005766  000002                  TST     2(SP)           ;;IS THIS THE FIRST CHAR
(1)  036066  001403                          BEQ     17$             ;;BRANCH IF YES
(1)  036070  006316                          ASL     (SP)            ;;NO, SHIFT PRESENT
(1)  036072  006316                          ASL     (SP)            ;;   CHAR OVER TO MAKE
(1)  036074  006316                          ASL     (SP)            ;;   ROOM FOR NEW ONE.
(1)  036076  005266  000002          17$:    INC     2(SP)           ;;KEEP COUNT OF CHAR
(1)  036102  056616  177776                  BIS     -2(SP),(SP)     ;;SET IN NEW CHAR
(1)  036106  000667                          BR      7$              ;;GET THE NEXT ONE
(1)  036110  104401  001222          18$:    TYPE    ,$QUES          ;;TYPE ?<CR><LF>
(1)  036114  000720                          BR      20$             ;;SIMULATE CONTROL-U
(1)                                  .DSABL  LSB
(1)
(1)
(2)                                  ;;**************************************************************************
(1)                                  ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
(1)                                  ;*CALL:
(1)                                  ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
(1)                                  ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
(1)                                  ;*                              ;;WITH PARITY BIT STRIPPED OFF
(1)                                  ;
(1)
(1)  036116  011646                  $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
(1)  036120  016666  000004  000002          MOV     4(SP),2(SP)     ;;SAVE THE PS
(1)  036126  105777  143012          1$:     TSTB    @$TKS           ;;WAIT FOR
(1)  036132  100375                          BPL     1$              ;;A CHARACTER
(1)  036134  117766  143006  000004          MOVB    @$TKB,4(SP)     ;;READ THE TTY
(1)  036142  042766  177600  000004          BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
(1)  036150  026627  000004  000023          CMP     4(SP),#23       ;;IS IT A CONTROL-S?
(1)  036156  001013                          BNE     3$              ;;BRANCH IF NO
(1)  036160  105777  142760          2$:     TSTB    @$TKS           ;;WAIT FOR A CHARACTER
(1)  036164  100375                          BPL     2$              ;;LOOP UNTIL ITS THERE
(1)  036166  117746  142754                  MOVB    @$TKB,-(SP)     ;;GET CHARACTER
(1)  036172  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
(1)  036176  022627  000021                  CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
(1)  036202  001366                          BNE     2$              ;;IF NOT DISCARD IT
(1)  036204  000750                          BR      1$              ;;YES, RESUME
(1)  036206  026627  000004  000140  3$:     CMP     4(SP),#140      ;;IS IT UPPER CASE?
(1)  036214  002407                          BLT     4$              ;;BRANCH IF YES
(1)  036216  026627  000004  000175          CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
(1)  036224  003003                          BGT     4$              ;;BRANCH IF YES
(1)  036226  042766  000040  000004          BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
(1)  036234  000002                  4$:     RTI                     ;;GO BACK TO USER
(2)                                  ;;**************************************************************************
(1)                                  ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
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(1)                                     ;*CALL:
(1)                                     ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
(1)                                     ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
(1)                                     ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
(1)
(1)  036236  010346                     $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
(1)  036240  005046                             CLR     -(SP)           ;;CLEAR THE RUBOUT KEY
(1)  036242  012703  036514             1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
(1)  036246  022703  036524             2$:     CMP     #$TTYIN+8.,R3   ;;BUFFER FULL?
(1)  036252  101467                             BLOS    4$              ;;BR IF YES
(1)  036254  104411                             RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
(1)  036256  112613                             MOVB    (SP)+,(R3)      ;;GET CHARACTER
(1)  036260  122713  000003                     CMPB    #3,(R3)         ;;IS IT A CONTROL-C?
(1)  036264  001006                             BNE     10$             ;;BRANCH IF NO
(1)  036266  104401  036524                     TYPE    ,$CNTLC         ;;TYPE A CONTROL-C (^C)
(1)  036272  005726                             TST     (SP)+           ;;CLEAN RUBOUT KEY OFF OF THE STACK
(1)  036274  012603                             MOV     (SP)+,R3        ;;RESTORE R3
(1)  036276  000137  036566                     JMP     CNTRLC          ;;GOTO CONTROL-C RESTART
(1)  036302  122713  000177             10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
(1)  036306  001022                             BNE     5$              ;;BR IF NO
(1)  036310  005716                             TST     (SP)            ;;IS THIS THE FIRST RUBOUT?
(1)  036312  001007                             BNE     6$              ;;BR IF NO
(1)  036314  112737  000134  036512             MOVB    #'\,9$          ;;TYPE A BACK SLASH
(1)  036322  104401  036512                     TYPE    ,9$
(1)  036326  012716  177777                     MOV     #-1,(SP)        ;;SET THE RUBOUT KEY
(1)  036332  005303                     6$:     DEC     R3              ;;BACKUP BY ONE
(1)  036334  020327  036514                     CMP     R3,#$TTYIN      ;;STACK EMPTY?
(1)  036340  103434                             BLO     4$              ;;BR IF YES
(1)  036342  111337  036512                     MOVB    (R3),9$         ;;SETUP TO TYPEOUT THE DELETED CHAR.
(1)  036346  104401  036512                     TYPE    ,9$             ;;GO TYPE
(1)  036352  000735                             BR      2$              ;;GO READ ANOTHER CHAR.
(1)  036354  005716                     5$:     TST     (SP)            ;;RUBOUT KEY SET?
(1)  036356  001406                             BEQ     7$              ;;BR IF NO
(1)  036360  112737  000134  036512             MOVB    #'\,9$          ;;TYPE A BACK SLASH
(1)  036366  104401  036512                     TYPE    ,9$
(1)  036372  005016                             CLR     (SP)            ;;CLEAR THE RUBOUT KEY
(1)  036374  122713  000025             7$:     CMPB    #25,(R3)        ;;IS CHARACTER A CTRL U?
(1)  036400  001003                             BNE     8$              ;;BR IF NO
(1)  036402  104401  036531                     TYPE    ,$CNTLU         ;;TYPE A CONTROL 'U'
(1)  036406  000715                             BR      1$              ;;GO START OVER
(1)  036410  122713  000022             8$:     CMPB    #22,(R3)        ;;IS CHARACTER A '^R'?
(1)  036414  001011                             BNE     3$              ;;BRANCH IF NO
(1)  036416  105013                             CLRB    (R3)            ;;CLEAR THE CHARACTER
(1)  036420  104401  001223                     TYPE    ,$CRLF          ;;TYPE A 'CR' & 'LF'
(1)  036424  104401  036514                     TYPE    ,$TTYIN         ;;TYPE THE INPUT STRING
(1)  036430  000706                             BR      2$              ;;GO PICKUP ANOTHER CHACTER
(1)  036432  104401  001222             4$:     TYPE    ,$QUES          ;;TYPE A '?'
(1)  036436  000701                             BR      1$              ;;CLEAR THE BUFFER AND LOOP
(1)  036440  111337  036512             3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
(1)  036444  104401  036512                     TYPE    ,9$
(1)  036450  122723  000015                     CMPB    #15,(R3)+       ;;CHECK FOR RETURN
(1)  036454  001274                             BNE     2$              ;;LOOP IF NOT RETURN
(1)  036456  105063  177777                     CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
(1)  036462  104401  001224                     TYPE    ,$LF            ;;TYPE A LINE FEED
(1)  036466  005726                             TST     (SP)+           ;;CLEAN RUBOUT KEY FROM THE STACK
(1)  036470  012603                             MOV     (SP)+,R3        ;;RESTORE R3
```

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  (1) 036472 011646                    MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
  (1) 036474 016666 000004 000002      MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
  (1) 036502 012766 036514 000004      MOV     #$TTYIN,4(SP)
  (1) 036510 000002                    RTI                     ;;RETURN
  (1) 036512    000              9$:   .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
  (1) 036513    000                    .BYTE   0               ;;TERMINATOR
  (1) 036514 000010              $TTYIN: .BLKB  8.             ;;RESERVE 8 BYTES FOR TTY INPUT
  (1) 036524 041536 005015 000   $CNTLC: .ASCIZ  /^C/<15><12>   ;;CONTROL ''C''
  (1) 036531    136 006525 000012 $CNTLU: .ASCIZ  /^U/<15><12>   ;;CONTROL ''U''
  (1) 036536 043536 005015 000   $CNTLG: .ASCIZ  /^G/<15><12>   ;;CONTROL ''G''
  (1) 036543    015 051412 051127 $MSWR:  .ASCIZ  <15><12>/SWR = /
  (1) 036550 036440 000040
  (1) 036554 020040 042516 020127 $MNEW:  .ASCIZ  /  NEW = /
  (1) 036562 020075    000
  (1)        036566              .EVEN
 3166
 3167                             .SBTTL  CONTROL-C SERVICING ROUTINE
 3168
 3169                             ;*      THE FOLLOWING CODE IS EXECUTED WHEN A CONTROL-C HAS
 3170                             ;*      BEEN TYPED INSTEAD OF A NEW SWITCH REG. VALUE.
 3171
 3172
 3173                             ;*      (IN OTHER WORDS, AFTER A CONTROL-G WAS TYPED).
 3174                             ;*      A NEW SWITCH REG. VALUE WILL BE ASKED FOR,
 3175                             ;*      THE TEST NUMBER AND PASS NUMBER WILL BE TYPED,
 3176                             ;*      AND THEN THE PROGRAM WILL GO TO ''END-OF-PASS'' AND CONTINUE
 3177
 3178 036566 013737 001234 001210 CNTRLC: MOV     $PASS,$TMP5     ;GET THE VALUE OF ''$PASS''
 3179 036574 005237 001210              INC     $TMP5           ;FORM CURRENT PASS NO.
 3180 036600 104401 036645              TYPE    ,CMSG           ;TYPE THE TEST STOPS MESSAGE
 3181 036604 113737 001102 036640       MOVB    $TSTNM,1$       ;SAVE THE TEST NUMBER
 3182 036612 013746 036640              MOV     1$,-(SP)        ;;SAVE 1$ FOR TYPEOUT
  (1) 036616 104402                     TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 3183 036620 104401 036642              TYPE    ,2$             ;TYPE 2 SPACES
 3184 036624 013746 001210              MOV     $TMP5,-(SP)     ;;SAVE $TMP5 FOR TYPEOUT
  (1) 036630 104405                     TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
 3185 036632 104407                     GTSWR                   ;ASK FOR NEW SWR VALUE
 3186 036634 000137 033616              JMP     $EOP+2          ;CONTINUE AT $EOP+2
 3187 036640 000000              1$:    .WORD   0               ;BUFFER FOR TEST NUMBER
 3188 036642 020040    000       2$:    .ASCIZ  /  /            ;TWO SPACES AND THE STOP MESSAGE
 3189 036645    112 046525 044520 CMSG:  .ASCII  /JUMPING TO END-OF-PASS/<15><12>
      036652 043516 052040 020117
      036660 047105 026504 043117
      036666 050055 051501 006523
      036674    012
 3190 036675    124 051505 047124        .ASCIZ  /TESTNO  PASSNO/<15><12>
      036702 020117 050040 051501
      036710 047123 006517 000012
 3191                                   .EVEN
 3192                             .SBTTL  TYPF ROUTINE
  (1)
  (2)                             ;;**********************************************************************
  (1)                             ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
  (1)                             ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
  (1)                             ;*NOTE1:        $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
  (1)                             ;*NOTE2:        $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
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(1)                                 ;*NOTE3:        $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
(1)                                 ;*
(1)                                 ;*CALL:
(1)                                 ;*1) USING A TRAP INSTRUCTION
(1)                                 ;*      TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
(1)                                 ;*OR
(1)                                 ;*      TYPE
(1)                                 ;*      MESADR
(1)                                 ;*
(1)
(1)  036716  105737  001157         $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
(1)  036722  100002                         BPL     1$              ;;BR IF YES
(1)  036724  000000                         HALT                    ;;HALT HERE IF NO TERMINAL
(1)  036726  000430                         BR      3$              ;;LEAVE
(1)  036730  010046                 1$:     MOV     R0,-(SP)        ;;SAVE R0
(1)  036732  017600  000002                 MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
(1)  036736  122737  000001  001246        CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
(1)  036744  001011                         BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
(1)  036746  132737  000100  001247        BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
(1)  036754  001405                         BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
(1)  036756  010037  036766                 MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
(1)  036762  004737  037206                 JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
(1)  036766  000000                 61$:    .WORD   0               ;;MESSAGE ADDRESS
(1)  036770  132737  000040  001247 62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
(1)  036776  001003                         BNE     60$             ;;YES,SKIP TYPE OUT
(1)  037000  112046                 2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
(1)  037002  001005                         BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
(1)  037004  005726                         TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
(1)  037006  012600                 60$:    MOV     (SP)+,R0        ;;RESTORE R0
(1)  037010  062716  000002         3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
(1)  037014  000002                         RTI                     ;;RETURN
(1)  037016  122716  000011         4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
(1)  037022  001430                         BEQ     8$
(1)  037024  122716  000200                 CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
(1)  037030  001006                         BNE     5$
(1)  037032  005726                         TST     (SP)+           ;;POP  <CR><LF> EQUIV
(1)  037034  104401                         TYPE                    ;;TYPE A CR AND LF
(1)  037036  001223                         $CRLF
(1)  037040  105037  037174                 CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
(1)  037044  000755                         BR      2$              ;;GET NEXT CHARACTER
(1)  037046  004737  037130         5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
(1)  037052  123726  001156         6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
(1)  037056  001350                         BNE     2$              ;;IF NO GO GET NEXT CHAR.
(1)  037060  013746  001154                 MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
(1)                                                                 ;;AND THE NULL CHAR.
(1)  037064  105366  000001         7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
(1)  037070  002770                         BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
(1)  037072  004737  037130                 JSR     PC,$TYPEC       ;;GO TYPE A NULL
(1)  037076  105337  037174                 DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
(1)  037102  000770                         BR      7$              ;;LOOP
(1)
(1)                                 ;HORIZONTAL TAB PROCESSOR
(1)
(1)  037104  112716  000040         8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
(1)  037110  004737  037130         9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
(1)  037114  132737  000007  037174        BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
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(1)  037122  001372                          BNE     9$              ;;TAB STOP
(1)  037124  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
(1)  037126  000724                          BR      2$              ;;GET NEXT CHARACTER
(1)  037130  105777  142014          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
(1)  037134  100375                          BPL     $TYPEC
(1)  037136  116677  000002  142006        MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
(1)  037144  122766  000015  000002        CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
(1)  037152  001003                          BNE     1$              ;;BRANCH IF NO
(1)  037154  105037  037174                 CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
(1)  037160  000406                          BR      $TYPEX          ;;EXIT
(1)  037162  122766  000012  000002  1$:    CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
(1)  037170  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
(1)  037172  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
(1)  037174  000000          $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
(1)  037176  000207          $TYPEX: RTS     PC
(1)
3193                                 .SBTTL  APT COMMUNICATIONS ROUTINE
(1)
(2)                                  ;;**************************************************************************
(1)  037200  112737  000001  037444  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
(1)  037206  112737  000001  037442  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
(1)  037214  000403                          BR      $ATYC
(1)  037216  112737  000001  037444  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
(1)  037224                          $ATYC:
(3)  037224  010046                          MOV     R0,-(SP)        ;;PUSH R0 ON STACK
(3)  037226  010146                          MOV     R1,-(SP)        ;;PUSH R1 ON STACK
(1)  037230  105737  037442                  TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
(1)  037234  001450                          BEQ     5$              ;;IF NOT:  BR
(1)  037236  122737  000001  001246          CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
(1)  037244  001031                          BNE     3$              ;;IF NOT:  BR
(1)  037246  132737  000100  001247          BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
(1)  037254  001425                          BEQ     3$              ;;IF NOT:  BR
(1)  037256  017600  000004                  MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
(1)  037262  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
(1)  037270  005737  001226          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
(1)  037274  001375                          BNE     1$              ;;IF NOT:  WAIT
(1)  037276  010037  001242                  MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
(1)  037302  105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
(1)  037304  001376                          BNE     2$
(1)  037306  163700  001242                  SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
(1)  037312  006200                          ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
(1)  037314  010037  001244                  MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
(1)  037320  012737  000004  001226          MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
(1)  037326  000413                          BR      5$
(1)  037330  017637  000004  037354  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
(1)  037336  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
(3)  037344  013746  177776                  MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
(1)  037350  004737  036716                  JSR     PC,$TYPE        ;;CALL TYPE MACRO
(1)  037354  000000          4$:     .WORD   0
(1)  037356                  5$:
(1)  037356  105737  037444          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
(1)  037362  001416                          BEQ     12$             ;;IF NOT:  BR
(1)  037364  005737  001246                  TST     $ENV            ;;RUNNING UNDER APT?
(1)  037370  001413                          BEQ     12$             ;;IF NOT:  BR
(1)  037372  005737  001226          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
(1)  037376  001375                          BNE     11$             ;;IF NOT:  WAIT
```

```
    (1)  037400  017637  000004  001230          MOV     @4(SP),$FATAL   ;;GET ERROR #
    (1)  037406  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
    (1)  037414  005237  001226                  INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
    (1)  037420  105037  037444          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
    (1)  037424  105037  037443                  CLRB    $LFLG           ;;CLEAR LOG FLAG
    (1)  037430  105037  037442                  CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
    (3)  037434  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
    (3)  037436  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
    (1)  037440  000207                          RTS     PC              ;;RETURN
    (1)  037442     000                  $MFLG:  .BYTE   0               ;;MESSG. FLAG
    (1)  037443     000                  $LFLG:  .BYTE   0               ;;LOG FLAG
    (1)  037444     000                  $FFLG:  .BYTE   0               ;;FATAL FLAG
    (1)          037446                          .EVEN
    (1)          000200                  APTSIZE=200
    (1)          000001                  APTENV=001
    (1)          000100                  APTSPOOL=100
    (1)          000040                  APTCSUP=040
 3194                                     .SBTTL  BINARY TO ASCII AND TYPE ROUTINE
    (1)
    (2)                                  ;;*****************************************************************
    (1)                                  ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 16-BIT
    (1)                                  ;*BINARY-ASCII NUMBER AND TYPE IT.
    (1)                                  ;*CALL:
    (1)                                  ;*      MOV     NUMBER,-(SP)    ;;NUMBER TO BE TYPED
    (1)                                  ;*      TYPBN                   ;;TYPE IT
    (1)
    (1)  037446  010146                  $TYPBN: MOV     R1,-(SP)        ;;SAVE R1 ON THE STACK
    (1)  037450  016601  000006                  MOV     6(SP),R1        ;;GET THE INPUT NUMBER
    (1)  037454  000261                          SEC                     ;;SET "C" SO CAN KEEP TRACK OF THE NUMBER OF BITS
    (1)  037456  112737  000060  037520  1$:     MOVB    #'0,$BIN        ;;SET CHARACTER TO AN ASCII "0".
    (1)  037464  006101                          ROL     R1              ;;GET THIS BIT
    (1)  037466  001406                          BEQ     2$              ;;DONE?
    (1)  037470  105537  037520                  ADCB    $BIN            ;;NO--SE. THE CHARACTER EQUAL TO THIS BIT
    (1)  037474  104401  037520                  TYPE    ,$BIN           ;;GO TYPE THIS BIT
    (1)  037500  000241                          CLC                     ;;CLEAR "C" SO CAN KEEP TRACK OF BITS
    (1)  037502  000765                          BR      1$              ;;GO DO THE NEXT BIT
    (1)  037504  012601                  2$:     MOV     (SP)+,R1        ;;POP THE STACK INTO R1
    (1)  037506  016666  000002  000004          MOV     2(SP),4(SP)     ;;ADJUST THE STACK
    (1)  037514  012616                          MOV     (SP)+,(SP)
    (1)  037516  000002                          RTI                     ;;RETURN TO USER
    (1)  037520     000     000          $BIN:   .BYTE   0,0             ;;STORAGE FOR ASCII CHAR. AND TERMINATOR
 3195                                     .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
    (1)
    (2)                                  ;;*****************************************************************
    (1)                                  ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
    (1)                                  ;*OCTAL (ASCII) NUMBER AND TYPE IT.
    (1)                                  ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
    (1)                                  ;*CALL:
    (1)                                  ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
    (1)                                  ;*      TYPOS                   ;;CALL FOR TYPEOUT
    (1)                                  ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
    (1)                                  ;*      .BYTE   M               ;;M=1 OR 0
    (1)                                  ;*                                      ;;1=TYPE LEADING ZEROS
    (1)                                  ;*                                      ;;0=SUPPRESS LEADING ZEROS
    (1)                                  ;*
    (1)                                  ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
```

```
(1)                                     ;*$TYPOS OR $TYPOC
(1)                                     ;*CALL:
(1)                                     ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
(1)                                     ;*      TYPON                   ;;CALL FOR TYPEOUT
(1)                                     ;*
(1)                                     ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
(1)                                     ;*CALL:
(1)                                     ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
(1)                                     ;*      TYPOC                   ;;CALL FOR TYPEOUT
(1)
(1)  037522  017646  000000             $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
(1)  037526  116637  000001  037745             MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
(1)  037534  112637  037747             $TYPOC: MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
(1)  037540  062716  000002                     ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
(1)  037544  000406                             BR      $TYPON
(1)  037546  112737  000001  037745             MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
(1)  037554  112737  000006  037747             MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
(1)  037562  112737  000005  037744     $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
(1)  037570  010346                             MOV     R3,-(SP)        ;;SAVE R3
(1)  037572  010446                             MOV     R4,-(SP)        ;;SAVE R4
(1)  037574  010546                             MOV     R5,-(SP)        ;;SAVE R5
(1)  037576  113704  037747                     MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
(1)  037602  005404                             NEG     R4
(1)  037604  062704  000006                     ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
(1)  037610  110437  037746                     MOVB    R4,$OMODE       ;;SAVE IT FOR USE
(1)  037614  113704  037745                     MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
(1)  037620  016605  000012                     MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
(1)  037624  005003                             CLR     R3              ;;CLEAR THE OUTPUT WORD
(1)  037626  006105                     1$:     ROL     R5              ;;ROTATE MSB INTO "C"
(1)  037630  000404                             BR      3$              ;;GO DO MSB
(1)  037632  006105                     2$:     ROL     R5              ;;FORM THIS DIGIT
(1)  037634  006105                             ROL     R5
(1)  037636  006105                             ROL     R5
(1)  037640  010503                             MOV     R5,R3
(1)  037642  006103                     3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
(1)  037644  105337  037746                     DECB    $OMODE          ;;TYPE THIS DIGIT?
(1)  037650  100016                             BPL     7$              ;;BR IF NO
(1)  037652  042703  177770                     BIC     #177770,R3      ;;GET RID OF JUNK
(1)  037656  001002                             BNE     4$              ;;TEST FOR 0
(1)  037660  005704                             TST     R4              ;;SUPPRESS THIS 0?
(1)  037662  001403                             BEQ     5$              ;;BR IF YES
(1)  037664  005204                     4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
(1)  037666  052703  000060                     BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
(1)  037672  052703  000040             5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
(1)  037676  110337  037742                     MOVB    R3,8$           ;;SAVE FOR TYPING
(1)  037702  104401  037742                     TYPE    ,8$             ;;GO TYPE THIS DIGIT
(1)  037706  105337  037744             7$:     DECB    $OCNT           ;;COUNT BY 1
(1)  037712  003347                             BGT     2$              ;;BR IF MORE TO DO
(1)  037714  002402                             BLT     6$              ;;BR IF DONE
(1)  037716  005204                             INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
(1)  037720  000744                             BR      2$              ;;GO DO THE LAST DIGIT
(1)  037722  012605                     6$:     MOV     (SP)+,R5        ;;RESTORE R5
(1)  037724  012604                             MOV     (SP)+,R4        ;;RESTORE R4
(1)  037726  012603                             MOV     (SP)+,R3        ;;RESTORE R3
(1)  037730  016666  000002  000004             MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
(1)  037736  012616                             MOV     (SP)+,(SP)
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(1)  037740  000002                        RTI                     ;;RETURN
(1)  037742     000     8$:                 .BYTE   0               ;;STORAGE FOR ASCII DIGIT
(1)  037743     000                         .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
(1)  037744     000     $OCNT:              .BYTE   0               ;;OCTAL DIGIT COUNTER
(1)  037745     000     $OFILL:             .BYTE   0               ;;ZERO FILL SWITCH
(1)  037746  000000     $OMODE:             .WORD   0               ;;NUMBER OF DIGITS TO TYPE
3196                                        .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
(1)
(2)                                         ;;**********************************************************************
(1)                                         ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
(1)                                         ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
(1)                                         ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
(1)                                         ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
(1)                                         ;*REPLACED WITH SPACES.
(1)                                         ;*CALL:
(1)                                         ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
(1)                                         ;*      TYPDS                   ;;GO TO THE ROUTINE
(1)
(1)  037750                                 $TYPDS:
(3)  037750  010046                         MOV     R0,-(SP)        ;;PUSH R0 ON STACK
(3)  037752  010146                         MOV     R1,-(SP)        ;;PUSH R1 ON STACK
(3)  037754  010246                         MOV     R2,-(SP)        ;;PUSH R2 ON STACK
(3)  037756  010346                         MOV     R3,-(SP)        ;;PUSH R3 ON STACK
(3)  037760  010546                         MOV     R5,-(SP)        ;;PUSH R5 ON STACK
(1)  037762  012746  020200                 MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
(1)  037766  016605  000020                 MOV     20(SP),R5       ;;GET THE INPUT NUMBER
(1)  037772  100004                         BPL     1$              ;;BR IF INPUT IS POS.
(1)  037774  005405                         NEG     R5              ;;MAKE THE BINARY NUMBER POS.
(1)  037776  112766  000055  000001         MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
(1)  040004  005000                 1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
(1)  040006  012703  040164                 MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
(1)  040012  112723  000040                 MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
(1)  040016  005002                 2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
(1)  040020  016001  040154                 MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
(1)  040024  160105                 3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
(1)  040026  002402                         BLT     4$              ;;BR IF DONE
(1)  040030  005202                         INC     R2              ;;INCREASE THE BCD DIGIT BY 1
(1)  040032  000774                         BR      3$
(1)  040034  060105                 4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
(1)  040036  005702                         TST     R2              ;;CHECK IF BCD DIGIT=0
(1)  040040  001002                         BNE     5$              ;;FALL THROUGH IF 0
(1)  040042  105716                         TSTB    (SP)            ;;STILL DOING LEADING 0'S?
(1)  040044  100407                         BMI     7$              ;;BR IF YES
(1)  040046  106316                 5$:     ASLB    (SP)            ;;MSD?
(1)  040050  103003                         BCC     6$              ;;BR IF NO
(1)  040052  116663  000001  177777         MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
(1)  040060  052702  000060         6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
(1)  040064  052702  000040         7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
(1)  040070  110223                         MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
(1)  040072  005720                         TST     (R0)+           ;;JUST INCREMENTING
(1)  040074  020027  000010                 CMP     R0,#10          ;;CHECK THE TABLE INDEX
(1)  040100  002746                         BLT     2$              ;;GO DO THE NEXT DIGIT
(1)  040102  003002                         BGT     8$              ;;GO TO EXIT
(1)  040104  010502                         MOV     R5,R2           ;;GET THE LSD
(1)  040106  000764                         BR      6$              ;;GO CHANGE TO ASCII
(1)  040110  105726                 8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
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(1)  040112  100003                    BPL     9$                ;;BR IF NO
(1)  040114  116663  177777  177776    MOVB    -1(SP),-2(R3)     ;;YES--SET THE SIGN FOR TYPING
(1)  040122  105013                9$: CLRB    (R3)              ;;SET THE TERMINATOR
(3)  040124  012605                    MOV     (SP)+,R5          ;;POP STACK INTO R5
(3)  040126  012603                    MOV     (SP)+,R3          ;;POP STACK INTO R3
(3)  040130  012602                    MOV     (SP)+,R2          ;;POP STACK INTO R2
(3)  040132  012601                    MOV     (SP)+,R1          ;;POP STACK INTO R1
(3)  040134  012600                    MOV     (SP)+,R0          ;;POP STACK INTO R0
(1)  040136  104401  040164            TYPE    ,$DBLK            ;;NOW TYPE THE NUMBER
(1)  040142  016666  000002  000004    MOV     2(SP),4(SP)       ;;ADJUST THE STACK
(1)  040150  012616                    MOV     (SP)+,(SP)
(1)  040152  000002                    RTI                       ;;RETURN TO USER
(1)  040154  023420                $DTBL:  10000.
(1)  040156  001750                        1000.
(1)  040160  000144                        100.
(1)  040162  000012                        10.
(1)  040164  000004                $DBLK:  .BLKW   4
3197                               .SBTTL  SAVE AND RESTORE R0-R5 ROUTINES
(1)
(2)                                ;;**********************************************************************
(1)                                ;*SAVE R0-R5
(1)                                ;*CALL:
(1)                                ;*      SAVREG
(1)                                ;*UPON RETURN FROM $SAVREG THE STACK WILL LOOK LIKE:
(1)                                ;*
(1)                                ;*TOP---(+16)
(1)                                ;* +2---(+18)
(1)                                ;* +4---R5
(1)                                ;* +6---R4
(1)                                ;* +8---R3
(1)                                ;*+10---R2
(1)                                ;*+12---R1
(1)                                ;*+14---R0
(1)
(1)  040174                        $SAVREG:
(3)  040174  010046                        MOV     R0,-(SP)          ;;PUSH R0 ON STACK
(3)  040176  010146                        MOV     R1,-(SP)          ;;PUSH R1 ON STACK
(3)  040200  010246                        MOV     R2,-(SP)          ;;PUSH R2 ON STACK
(3)  040202  010346                        MOV     R3,-(SP)          ;;PUSH R3 ON STACK
(3)  040204  010446                        MOV     R4,-(SP)          ;;PUSH R4 ON STACK
(3)  040206  010546                        MOV     R5,-(SP)          ;;PUSH R5 ON STACK
(1)  040210  016646  000022                MOV     22(SP),-(SP)      ;;SAVE PS OF MAIN FLOW
(1)  040214  016646  000022                MOV     22(SP),-(SP)      ;;SAVE PC OF MAIN FLOW
(1)  040220  016646  000022                MOV     22(SP),-(SP)      ;;SAVE PS OF CALL
(1)  040224  016646  000022                MOV     22(SP),-(SP)      ;;SAVE PC OF CALL
(1)  040230  000002                        RTI
(1)
(1)                                ;*RESTORE R0-R5
(1)                                ;*CALL:
(1)                                ;*      RESREG
(1)  040232                        $RESREG:
(1)  040232  012666  000022                MOV     (SP)+,22(SP)      ;;RESTORE PC OF CALL
(1)  040236  012666  000022                MOV     (SP)+,22(SP)      ;;RESTORE PS OF CALL
(1)  040242  012666  000022                MOV     (SP)+,22(SP)      ;;RESTORE PC OF MAIN FLOW
(1)  040246  012666  000022                MOV     (SP)+,22(SP)      ;;RESTORE PS OF MAIN FLOW
(3)  040252  012605                        MOV     (SP)+,R5          ;;POP STACK INTO R5
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(3)  040254  012604                    MOV     (SP)+,R4        ;;POP STACK INTO R4
(3)  040256  012603                    MOV     (SP)+,R3        ;;POP STACK INTO R3
(3)  040260  012602                    MOV     (SP)+,R2        ;;POP STACK INTO R2
(3)  040262  012601                    MOV     (SP)+,R1        ;;POP STACK INTO R1
(3)  040264  012600                    MOV     (SP)+,R0        ;;POP STACK INTO R0
(1)  040266  000002                    RTI
3198                            .SBTTL  DOUBLE LENGTH BINARY TO OCTAL ASCII CONVERT ROUTINE
(1)
(2)                             ;;**********************************************************************
(1)                             ;*THIS ROUTINE WILL CONVERT A 32-BIT UNSIGNED BINARY NUMBER TO AN
(1)                             ;*UNSIGNED OCTAL ASCIZ NUMBER.
(1)                             ;*CALL
(1)                             ;*      MOV     #PNTR,-(SP)     ;;POINTER TO LOW WORD OF BINARY NUMBER
(1)                             ;*      JSR     PC,@#$DB20      ;;CALL THE ROUTINE
(1)                             ;*      RETURN                  ;;THE ADDRESS OF THE FIRST ASCIZ CHAR. IS ON THE STACK
(1)
(1)
(1)  040270  104413             $DB20:  SAVREG                  ;;SAVE ALL REGISTERS
(1)  040272  016601  000002             MOV     2(SP),R1        ;;PICKUP THE POINTER TO LOW WORD
(1)  040276  012705  040407             MOV     #$OCTVL+13.,R5  ;;POINTER TO DATA TABLE
(1)  040302  012704  000014             MOV     #12.,R4         ;;DO ELEVEN CHARACTERS
(1)  040306  012703  177770             MOV     #^C7,R3         ;;MASK
(1)  040312  012100                     MOV     (R1)+,R0        ;;LOWER WORD
(1)  040314  012101                     MOV     (R1)+,R1        ;;HIGH WORD
(1)  040316  005002                     CLR     R2              ;;TERMINATOR
(1)  040320  110245             1$:     MOVB    R2,-(R5)        ;;PUT CHARACTER IN DATA TABLE
(1)  040322  010002                     MOV     R0,R2           ;;GET THIS DIGIT
(1)  040324  005304                     DEC     R4              ;;COUNT THIS CHARACTER
(1)  040326  003007                     BGT     3$              ;;BR IF NOT THE LAST DIGIT
(1)  040330  001405                     BEQ     2$              ;;BR IF IT IS THE LAST DIGIT
(1)  040332  005205                     INC     R5              ;;ALL DIGITS DONE-ADJUST POINTER FOR FIRST
(1)  040334  010566  000002             MOV     R5,2(SP)        ;;ASCIZ CHAR. & PUT IT ON THE STACK
(1)  040340  104414                     RESREG                  ;;RESTORE ALL REGISTERS
(1)  040342  000207                     RTS     PC              ;;RETURN TO USER
(1)  040344  006203             2$:     ASR     R3              ;;POSITION THE MASK FOR THE LAST DIGIT
(1)  040346  006001             3$:     ROR     R1              ;;POSITION THE BINARY NUMBER FOR
(1)  040350  006000                     ROR     R0              ;;      THE NEXT OCTAL DIGIT
(1)  040352  006001                     ROR     R1
(1)  040354  006000                     ROR     R0
(1)  040356  006001                     ROR     R1
(1)  040360  006000                     ROR     R0
(1)  040362  040302                     BIC     R3,R2           ;;MASK OUT ALL JUNK
(1)  040364  062702  000060             ADD     #'0,R2          ;;MAKE THIS CHAR. ASCII
(1)  040370  000753                     BR      1$              ;;GO PUT IT IN THE DATA TABLE
(1)  040372  000016             $OCTVL: .BLKB   14.             ;;RESERVE DATA TABLE
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3200                                    .SBTTL  TRAP DECODER
 (1)
 (2)                                    ;;**********************************************************************
 (1)                                    ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE ''TRAP'' INSTRUCTION
 (1)                                    ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
 (1)                                    ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
 (1)                                    ;*GO TO THAT ROUTINE.
 (1)
 (1)  040410  010046                    $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
 (1)  040412  016600  000002                    MOV     2(SP),R0        ;;GET TRAP ADDRESS
 (1)  040416  005740                            TST     -(R0)           ;;BACKUP BY 2
 (1)  040420  111000                            MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
 (1)  040422  006300                            ASL     R0              ;;POSITION FOR INDEXING
 (1)  040424  016000  040444                    MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
 (1)  040430  000200                            RTS     R0              ;;GO TO ROUTINE
 (1)
 (1)
 (1)                                    ;;THIS IS USE TO HANDLE THE ''GETPRI'' MACRO
 (1)
 (1)  040432  011646                    $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
 (1)  040434  016666  000004  000002            MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
 (1)  040442  000002                            RTI                     ;;RESTORE THE PSW
 (1)
 (3)                                    .SBTTL  TRAP TABLE
 (3)
 (3)                                    ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
 (3)                                    ;*BY THE ''TRAP'' INSTRUCTION.
 (3)
 (3)                                    ;       ROUTINE
 (3)                                    ;       -------
 (3)  040444  040432                    $TRPAD: .WORD   $TRAP2
 (3)  040446  036716                            $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
 (3)  040450  037516                            $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
 (3)  040452  037522                            $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
 (3)  040454  037562                            $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
 (3)  040456  037750                            $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
 (3)  040460  037446                            $TYPBN  ;;CALL=TYPBN    TRAP+6(104406)  TYPE BINARY (ASCII) NUMBER
 (1)
 (3)  040462  035644                            $GTSWR  ;;CALL=GTSWR    TRAP+7(104407)  GET SOFT-SWR SETTING
 (1)
 (3)  040464  035574                            $CKSWR  ;;CALL=CKSWR    TRAP+10(104410) TEST FOR CHANGE IN SOFT-SWR
 (3)  040466  036116                            $RDCHR  ;;CALL=RDCHR    TRAP+11(104411) TTY TYPEIN CHARACTER ROUTINE
 (3)  040470  036236                            $RDLIN  ;;CALL=RDLIN    TRAP+12(104412) TTY TYPEIN STRING ROUTINE
 (3)  040472  040174                            $SAVREG ;;CALL=SAVREG   TRAP+13(104413) SAVE R0-R5 ROUTINE
 (3)  040474  040232                            $RESREG ;;CALL=RESREG   TRAP+14(104414) RESTORE R0-R5 ROUTINE
3201                                    .SBTTL  POWER DOWN AND UP ROUTINES
 (1)
 (2)                                    ;;**********************************************************************
 (1)                                    ;POWER DOWN ROUTINE
 (1)  040476  012737  040654  000024    $PWRDN: MOV     #$ILLUP,@#PWRVEC ;;SET FOR FAST UP
 (1)  040504  012737  000340  000026            MOV     #340,@#PWRVEC+2 ;;PRIO:7
 (3)  040512  010046                            MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 (3)  040514  010146                            MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 (3)  040516  010246                            MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 (3)  040520  010346                            MOV     R3,-(SP)        ;;PUSH R3 ON STACK
 (3)  040522  010446                            MOV     R4,-(SP)        ;;PUSH R4 ON STACK
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(3)  040524  010546                        MOV     R5,-(SP)          ;;PUSH R5 ON STACK
(3)  040526  017746  140406                MOV     @SWR,-(SP)        ;;PUSH @SWR ON STACK
(1)  040532  010637  040660                MOV     SP,$SAVR6         ;;SAVE SP
(1)  040536  012737  040550  000024        MOV     #$PWRUP,@#PWRVEC  ;;SET UP VECTOR
(1)  040544  000000                        HALT
(1)  040546  000776                        BR      .-2               ;;HANG UP
(1)
(2)                                        ;;****************************************************************
(1)                                        ;POWER UP ROUTINE
(1)  040550  012737  040654  000024  $PWRUP: MOV     #$ILLUP,@#PWRVEC  ;;SET FOR FAST DOWN
(1)  040556  013706  040660                MOV     $SAVR6,SP         ;;GET SP
(1)  040562  005037  040660                CLR     $SAVR6            ;;WAIT LOOP FOR THE TTY
(1)  040566  005237  040660          1$:   INC     $SAVR6            ;;WAIT FOR THE INC
(1)  040572  001375                        BNE     1$                ;;OF  WORD
(3)  040574  012677  140340                MOV     (SP)+,@SWR        ;;POP STACK INTO @SWR
(3)  040600  012605                        MOV     (SP)+,R5          ;;POP STACK INTO R5
(3)  040602  012604                        MOV     (SP)+,R4          ;;POP STACK INTO R4
(3)  040604  012603                        MOV     (SP)+,R3          ;;POP STACK INTO R3
(3)  040606  012602                        MOV     (SP)+,R2          ;;POP STACK INTO R2
(3)  040610  012601                        MOV     (SP)+,R1          ;;POP STACK INTO R1
(3)  040612  012600                        MOV     (SP)+,R0          ;;POP STACK INTO R0
(1)  040614  012737  040476  000024        MOV     #$PWRDN,@#PWRVEC  ;;SET UP THE POWER DOWN VECTOR
(1)  040622  012737  000340  000026        MOV     #340,@#PWRVEC+2   ;;PRIO:7
(1)  040630  104401                        TYPE                      ;;REPORT THE POWER FAILURE
(1)  040632  040662                $PWRMG: .WORD   PWRMSG            ;;POWER FAIL MESSAGE POINTER
(1)  040634  012716                        MOV     (PC)+,(SP)        ;;RESTART AT RESTRT
(1)  040636  020464                $PWRAD: .WORD   RESTRT            ;;RESTART ADDRESS
(1)  040640  042766  000020  000002        BIC     #20,2(SP)         ;;CLEAR 'T' BIT
(1)  040646  005037  034130                CLR     $TBIT             ;;CLEAR THE 'T' BIT FLAG
(1)  040652  000002                        RTI
(1)  040654  000000                $ILLUP: HALT                      ;;THE POWER UP SEQUENCE WAS STARTED
(1)  040656  000776                        BR      .-2               ;; BEFORE THE POWER DOWN WAS COMPLETE
(1)  040660  000000                $SAVR6: 0                         ;;PUT THE SP HERE
3202 040662  006412  050040  053517  PWRMSG: .ASCIZ  <12><15>? POWER FAILURE - RESTARTING ?<12><15>
     040670  051105  043040  044501
     040676  052514  042522  026440
     040704  051040  051505  040524
     040712  052122  047111  020107
     040720  006412     000
3203         040724                        .EVEN
3204
3205
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                                        .SBTTL  ERROR MESSAGES, DATA HEADERS-TABLES & FORMATS
040724 047125 054105 042520 EM1:    .ASCIZ  /UNEXPECTED CPU TRAP TO LOC. 004/
040732 052103 042105 041440
040740 052520 052040 040522
040746 020120 047524 046040
040754 041517 020056 030060
040762 000064
040764 047125 054105 042520 EM2:    .ASCIZ  /UNEXPECTED MEM. MGMT. TRAP TO LOC. 250/
040772 052103 042105 046440
041000 046505 020056 043515
041006 052115 020056 051124
041014 050101 052040 020117
041022 047514 027103 031040
041030 030065    000
041033    120 044522 051117 EM3:    .ASCIZ  /PRIORITY BITS SET WRONG IN PSW/
041040 052111 020131 044502
041046 051524 051440 052105
041054 053440 047522 043516
041062 044440 020116 051520
041070 000127
041072 047515 042504 041040 EM4:    .ASCIZ  /MODE BITS SET WRONG IN PSW/
041100 052111 020123 042523
041106 020124 051127 047117
041114 020107 047111 050040
041122 053523    000
041125    104 040525 020114 EM5:    .ASCIZ  /DUAL ADDRESSING BETWEEN HI&LO BYTES OF PSW/
041132 042101 051104 051505
041140 044523 043516 041040
041146 052105 042527 047105
041154 044040 023111 047514
041162 041040 052131 051505
041170 047440 020106 051520
041176 000127
041200 042513 047122 046105 EM6:    .ASCIZ  /KERNEL R6 CHANGED BY WRITING USER R6/
041206 051040 020066 044103
041214 047101 042507 020104
041222 054502 053440 044522
041230 044524 043516 052440
041236 042523 020122 033122
041244    000
041245    101 046440 046505 EM7:    .ASCIZ  /A MEMORY MGMT. REG. TIMED OUT/
041252 051117 020131 043515
041260 052115 020056 042522
041266 027107 052040 046511
041274 042105 047440 052125
041302    000
041303    123 046525 040515 EM10:   .ASCIZ  /SUMMARY OF MEM. MGMT. REG. TIMEOUTS/
041310 054522 047440 020106
041316 042515 027115 046440
041324 046507 027124 051040
041332 043505 020056 044524
041340 042515 052517 051524
041346    000
041347    115 046505 020056 EM11:   .ASCIZ  /MEM. MGMT. REG. WOULD NOT CLEAR/
041354 043515 052115 020056
041362 042522 027107 053440
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                041370  052517  042114  047040
                041376  052117  041440  042514
                041404  051101     000
3217            041407     115  046505  020056  EM12:   .ASCIZ  /MEM. MGMT. REG. BITS NOT SET CORRECTLY/
                041414  043515  052115  020056
                041422  042522  027107  041040
                041430  052111  020123  047516
                041436  020124  042523  020124
                041444  047503  051122  041505
                041452  046124  000131
3218            041456  051123  020060  043105  EM13:   .ASCIZ  /SR0 EFFECTED BY WRITE TO PSW/
                041464  042506  052103  042105
                041472  041040  020131  051127
                041500  052111  020105  047524
                041506  050040  053523     000
3219            041513     123  030522  042040  EM14:   .ASCIZ  /SR1 DID NOT READ ALL ZEROS/
                041520  042111  047040  052117
                041526  051040  040505  020104
                041534  046101  020114  042532
                041542  047522  000123
3220            041546  052504  046101  040440  EM15:   .ASCIZ  /DUAL ADDRESSING BETWEEN BYTES OF PAR OR PDR/
                041554  042104  042522  051523
                041562  047111  020107  042502
                041570  053524  042505  020116
                041576  054502  042524  020123
                041604  043117  050040  051101
                041612  047440  020122  042120
                041620  000122
3221            041622  052504  046101  040440  EM16:   .ASCIZ  /DUAL ADDRESSING BETWEEN PAR-PDR'S/
                041630  042104  042522  051523
                041636  047111  020107  042502
                041644  053524  042505  020116
                041652  040520  026522  042120
                041660  023522  000123
3222            041664  044120  051531  041511  EM17:   .ASCIZ  /PHYSICAL ADDRESS FORMED WRONG/
                041672  046101  040440  042104
                041700  042522  051523  043040
                041706  051117  042515  020104
                041714  051127  047117  000107
3223            041722  044120  051531  020056  EM20:   .ASCIZ  /PHYS. ADDR. FORMED WRONG IN RELOCATE MODE/
                041730  042101  051104  020056
                041736  047506  046522  042105
                041744  053440  047522  043516
                041752  044440  020116  042522
                041760  047514  040503  042524
                041766  046440  042117  000105
3224            041774  026527  044502  020124  EM21:   .ASCIZ  /W-BIT DID NOT GET SET IN PDR/
                042002  044504  020104  047516
                042010  020124  042507  020124
                042016  042523  020124  047111
                042024  050040  051104     000
3225            042031     127  041055  052111  EM22:   .ASCIZ  /W-BIT SET IN MORE THAN ONE PDR/
                042036  051440  052105  044440
                042044  020116  047515  042522
                042052  052040  040510  020116
                042060  047117  020105  042120
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                042066  000122
3226            042070  026527  044502  020124  EM23:   .ASCIZ  /W-BIT NOT CLEARED BY WRITING TO PDR/
                042076  047516  020124  046103
                042104  040505  042522  020104
                042112  054502  053440  044522
                042120  044524  043516  052040
                042126  020117  042120  000122
3227            042134  051127  052111  047111  EM24:   .ASCIZ  /WRITING SR0 SET W-BIT IN KIPDR7/
                042142  020107  051123  020060
                042150  042523  020124  026527
                042156  044502  020124  047111
                042164  045440  050111  051104
                042172  000067
3228            042174  026527  044502  020124  EM25:   .ASCIZ  /W-BIT GOT SET DURING TIMEOUT ABORT/
                042202  047507  020124  042523
                042210  020124  052504  044522
                042216  043516  052040  046511
                042224  047505  052125  040440
                042232  047502  052122     000
3229            042237     115  046505  051117  EM26:   .ASCIZ  /MEMORY MGMT. ACCESS ABORT DID NOT OCCUR/
                042244  020131  043515  052115
                042252  020056  041501  042503
                042260  051523  040440  047502
                042266  052122  042040  042111
                042274  047040  052117  047440
                042302  041503  051125     000
3230            042307     101  041503  051505  EM27:   .ASCIZ  /ACCESS ERROR DID NOT ABORT INSTRUCTION/
                042314  020123  051105  047522
                042322  020122  044504  020104
                042330  047516  020124  041101
                042336  051117  020124  047111
                042344  052123  052522  052103
                042352  047511  000116
3231            042356  051123  020060  044504  EM30:   .ASCIZ  /SR0 DID NOT REPORT ACCESS ERROR CORRECTLY/
                042364  020104  047516  020124
                042372  042522  047520  052122
                042400  040440  041503  051505
                042406  020123  051105  047522
                042414  020122  047503  051122
                042422  041505  046124  000131
3232            042430  044504  020104  047516  EM31:   .ASCIZ  /DID NOT LOCKUP CORRECT VIRTUAL ADDR./
                042436  020124  047514  045503
                042444  050125  041440  051117
                042452  042522  052103  053040
                042460  051111  052524  046101
                042466  040440  042104  027122
                042474     000
3233            042475     120  043501  020105  EM32:   .ASCIZ  /PAGE LGTH. ABORT OCCURRED WHEN IT SHOULDN'T HAVE/
                042502  043514  044124  020056
                042510  041101  051117  020124
                042516  041517  052503  051122
                042524  042105  053440  042510
                042532  020116  052111  051440
                042540  047510  046125  047104
                042546  052047  044040  053101
                042554  000105
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3234  042556  040520  042507  046040  EM33:   .ASCIZ  /PAGE LGTH. ABORT DID NOT OCCUR WHEN IT SHOULD HAVE/
      042564  052107  027110  040440
      042572  047502  052122  042040
      042600  042111  047040  052117
      042606  047440  041503  051125
      042614  053440  042510  020116
      042622  052111  051440  047510
      042630  046125  020104  040510
      042636  042526     000
3235  042641     123  030122  042040  EM34:   .ASCIZ  /SR0 DID NOT REPORT PAGE LGTH. ABORT CORRECTLY/
      042646  042111  047040  052117
      042654  051040  050105  051117
      042662  020124  040520  042507
      042670  046040  052107  027110
      042676  040440  047502  052122
      042704  041440  051117  042522
      042712  052103  054514     000
3236  042717     123  030122  047440  EM37:   .ASCIZ  /SR0 OR SR2 CHANGED BY A SECOND ABORT/
      042724  020122  051123  020062
      042732  044103  047101  042507
      042740  020104  054502  040440
      042746  051440  041505  047117
      042754  020104  041101  051117
      042762  000124
3237  042764  051123  020060  051117  EM40:   .ASCIZ  /SR0 OR SR2 WERE NOT 'RESET' BY A RESET/
      042772  051440  031122  053440
      043000  051105  020105  047516
      043006  020124  051042  051505
      043014  052105  020042  054502
      043022  040440  051040  051505
      043030  052105     000
3238  043033     123  031122  047040  EM41:   .ASCIZ  /SR2 NOT TRACKING CORRECTLY/
      043040  052117  052040  040522
      043046  045503  047111  020107
      043054  047503  051122  041505
      043062  046124  000131
3239  043066  044504  020104  047516  EM42:   .ASCIZ  /DID NOT TRAP THRU KERNEL SPACE/
      043074  020124  051124  050101
      043102  052040  051110  020125
      043110  042513  047122  046105
      043116  051440  040520  042503
      043124     000
3240  043125     113  020124  051105  EM43:   .ASCIZ  /KT ERROR NOT SERVICED ON TIMEOUT ERROR/
      043132  047522  020122  047516
      043140  020124  042523  053122
      043146  041511  042105  047440
      043154  020116  044524  042515
      043162  052517  020124  051105
      043170  047522  000122
3241  043174  051123  020060  051117  EM44:   .ASCIZ  /SR0 OR SR2 CHANGED BY TIMEOUT ERROR/
      043202  051440  031122  041440
      043210  040510  043516  042105
      043216  041040  020131  044524
      043224  042515  052517  020124
      043232  051105  047522  000122
3242  043240  051105  047522  020122  EM45:   .ASCIZ  /ERROR DURING 'DOUBLE ERROR' (KT & TIMEOUT)/
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                043246  052504  044522  043516
                043254  021040  047504  041125
                043262  042514  042440  051122
                043270  051117  020042  045450
                043276  020124  020046  044524
                043304  042515  052517  024524
                043312     000
3243            043313     115  050106  020111  EM46:   .ASCIZ  /MFPI INSTRUCTION PUSHED WRONG DATA/
                043320  047111  052123  052522
                043326  052103  047511  020116
                043334  052520  044123  042105
                043342  053440  047522  043516
                043350  042040  052101  000101
3244            043356  052115  044520  044440  EM47:   .ASCIZ  /MTPI INSTRUCTION LOADED WRONG DATA/
                043364  051516  051124  041525
                043372  044524  047117  046040
                043400  040517  042504  020104
                043406  051127  047117  020107
                043414  040504  040524     000
3245            043421     123  040524  045503  EM50:   .ASCIZ  /STACK NOT PUSHED BY MFPI-MTPI/
                043426  047040  052117  050040
                043434  051525  042510  020104
                043442  054502  046440  050106
                043450  026511  052115  044520
                043456     000
3246            043457     113  051105  042516  EM51:   .ASCIZ  /KERNEL PAGE ACCESS INSTEAD OF USER: MFPI-MTPI/
                043464  020114  040520  042507
                043472  040440  041503  051505
                043500  020123  047111  052123
                043506  040505  020104  043117
                043514  052440  042523  035122
                043522  046440  050106  026511
                043530  052115  044520     000
3247            043535     127  047522  043516  EM52:   .ASCIZ  /WRONG PDR'S REFERENCED WHILE IN RELOCATE MODE/
                043542  050040  051104  051447
                043550  051040  043105  051105
                043556  047105  042503  020104
                043564  044127  046111  020105
                043572  047111  051040  046105
                043600  041517  052101  020105
                043606  047515  042504     000
3248            043613     115  050106  020104  EM53:   .ASCIZ  /MFPD INSTRUCTION PUSHED WRONG DATA/
                043620  047111  052123  052522
                043626  052103  047511  020116
                043634  052520  044123  042105
                043642  053440  047522  043516
                043650  042040  052101  000101
3249            043656  052123  041501  020113  EM54:   .ASCIZ  /STACK NOT PUSHED BY MFPD-MTPD/
                043664  047516  020124  052520
                043672  044123  042105  041040
                043700  020131  043115  042120
                043706  046455  050124  000104
3250            043714  040520  020122  051117  EM55:   .ASCIZ  /PAR OR PDR CHANGED BY A RESET/
                043722  050040  051104  041440
                043730  040510  043516  042105
                043736  041040  020131  020101
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                043744  042522  042523  000124
3251            043752  051520  020127  044103  EM56:   .ASCIZ  /PSW CHANGED BY AN RTI IN USER MODE/
                043760  047101  042507  020104
                043766  054502  040440  020116
                043774  052122  020111  047111
                044002  052440  042523  020122
                044010  047515  042504     000
3252
3253            044015     117  042114  050040  DH1:    .ASCIZ  /OLD PC  OLD PSW R6 WAS  TESTNO  ERRORPC/
                044022  020103  047440  042114
                044030  050040  053523  051040
                044036  020066  040527  020123
                044044  052040  051505  047124
                044052  020117  042440  051122
                044060  051117  041520     000
3254            044065     117  042114  050040  DH2:    .ASCIZ  /OLD PC  OLD PSW R6 WAS  SR0     SR2     TESTNO  ERRORPC/
                044072  020103  047440  042114
                044100  050040  053523  051040
                044106  020066  040527  020123
                044114  051440  030122  020040
                044122  020040  051440  031122
                044130  020040  020040  052040
                044136  051505  047124  020117
                044144  042440  051122  051117
                044152  041520     000
3255            044155     127  047522  042524  DH3:    .ASCIZ  /WROTE   READ    TESTNO  ERRORPC/
                044162  020040  051040  040505
                044170  020104  020040  052040
                044176  051505  047124  020117
                044204  042440  051122  051117
                044212  041520     000
3256            044215     101  042104  042522  DH7:    .ASCIZ  /ADDRESS TESTNO  ERRORPC/
                044222  051523  052040  051505
                044230  047124  020117  042440
                044236  051122  051117  041520
                044244     000
3257            044245     122  043505  051511  DH10:   .ASCII  /REGISTER-ADDRS  NUM  OF/<CRLF>
                044252  042524  026522  042101
                044260  051104  020123  047040
                044266  046525  020040  043117
                044274     200
3258            044275     101  042116  042455          .ASCIZ  /AND-ED  OR-ED   TIMOUTS TESTNO  ERRORPC/
                044302  020104  047440  026522
                044310  042105  020040  052040
                044316  046511  052517  051524
                044324  052040  051505  047124
                044332  020117  042440  051122
                044340  051117  041520     000
3259            044345     122  043505  051511  DH11:   .ASCII  /REGISTR READ    READ-(BINARY)/<CRLF>
                044352  051124  051040  040505
                044360  020104  020040  051040
                044366  040505  026504  041050
                044374  047111  051101  024531
                044402     200
3260            044403     101  042104  042522          .ASCIZ  /ADDRESS (OCTAL) 5432109876543210  TESTNO  ERRORPC/
                044410  051523  024040  041517
```

```
        044416  040524  024514  032440
        044424  031464  030462  034460
        044432  033470  032466  031464
        044440  030462  020060  052040
        044446  051505  047124  020117
        044454  042440  051122  051117
        044462  041520     000
3261    044465     122  043505  051511  DH12:   .ASCII  /REGISTR WROTE   REAr    READ-(BINARY)/<CRLF>
        044472  051124  053440  047522
        044500  042524  020040  051040
        044506  040505  020104  020040
        044514  051040  040505  026504
        044522  041050  047111  051101
        044530  024531     200
3262    044533     101  042104  042522          .ASCIZ  /ADDRESS (OCTAL) (OCTAL) 5432109876543210  TESTNO  ERRORPC/
        044540  051523  024040  041517
        044546  040524  024514  024040
        044554  041517  040524  024514
        044562  032440  031464  030462
        044570  034460  033470  032466
        044576  031464  030462  020060
        044604  052040  051505  047124
        044612  020117  042440  051122
        044620  051117  041520     000
3263    044625     122  040505  020104  DH13:   .ASCIZ  /READ    TESTNO  ERRORPC/
        044632  020040  052040  051505
        044640  047124  020117  042440
        044646  051122  051117  041520
        044654     000
3264    044655     120  051101  050055  DH16:   .ASCII  /PAR-PDR PAR-PDR/<CRLF>
        044662  051104  050040  051101
        044670  050055  051104     200
3265    044675     103  042514  051101          .ASCIZ  /CLEARED EFFECTD EXPECTD RECEIVD TESTNO  ERRORPC/
        044702  042105  042440  043106
        044710  041505  042124  042440
        044716  050130  041505  042124
        044724  051040  041505  044505
        044732  042126  052040  051505
        044740  047124  020117  042440
        044746  051122  051117  041520
        044754     000
3266    044755     120  054510  044523  DH17:   .ASCII  /PHYSICL VIRTUAL/<CRLF>
        044762  046103  053040  051111
        044770  052524  046101     200
3267    044775     101  042104  042522          .ASCIZ  /ADDRESS ADDRESS KIPAR4  TESTNO  ERRORPC/
        045002  051523  040440  042104
        045010  042522  051523  045440
        045016  050111  051101  020064
        045024  052040  051505  047124
        045032  020117  042440  051122
        045040  051117  041520     000
3268    045045     120  054510  044523  DH20:   .ASCII  /PHYSICL PAR 4   PAR 5/<CRLF>
        045052  046103  050040  051101
        045060  032040  020040  050040
        045066  051101  032440     200
3269    045073     101  042104  042522          .ASCIZ  /ADDRESS VBA     VBA     PAR 4   PAR 5   PSW     TESTNO  ERRORPC/
```

```
                045100  051523  053040  040502
                045106  020040  020040  053040
                045114  040502  020040  020040
                045122  050040  051101  032040
                045130  020040  050040  051101
                045136  032440  020040  050040
                045144  053523  020040  020040
                045152  052040  051505  047124
                045160  020117  042440  051122
                045166  051117  041520     000
3270            045173     120  051104  020040  DH21:   .ASCII  /PDR     VIRTUAL/<CRLF>
                045200  020040  053040  051111
                045206  052524  046101     200
3271            045213     124  051505  042524          .ASCIZ  /TESTED  ADDRESS TESTNO  ERRORPC/
                045220  020104  040440  042104
                045226  042522  051523  052040
                045234  051505  047124  020117
                045242  042440  051122  051117
                045250  041520     000
3272            045253     120  051104  044440  DH22:   .ASCII  /PDR IN  PDR     VIRTUAL/
                045260  020116  050040  051104
                045266  020040  020040  053040
                045274  051111  052524  046101
3273            045302  051105  047522  020122          .ASCIZ  /ERROR   TESTED  ADDRESS TESTNO  ERRORPC/
                045310  020040  042524  052123
                045316  042105  020040  042101
                045324  051104  051505  020123
                045332  042524  052123  047516
                045340  020040  051105  047522
                045346  050122  000103
3274            045352  042120  020122  020040  DH23:   .ASCIZ  /PDR     TESTNO  ERRORPC/
                045360  020040  042524  052123
                045366  047516  020040  051105
                045374  047522  050122  000103
3275            045402  042120  020122  040527  DH24:   .ASCIZ  /PDR WAS EXPECTD TESTNO  ERRORPC/
                045410  020123  054105  042520
                045416  052103  020104  042524
                045424  052123  047516  020040
                045432  051105  047522  050122
                045440  000103
3276            045442  042120  020122  020064  DH26:   .ASCIZ  /PDR 4   PSW     TESTNO  ERRORPC/
                045450  020040  051520  020127
                045456  020040  020040  042524
                045464  052123  047516  020040
                045472  051105  047522  050122
                045500  000103
3277            045502  051123  020060  040527  DH30:   .ASCIZ  /SR0 WAS EXPECTD PDR 4   PSW     TESTNO  ERRORPC/
                045510  020123  054105  042520
                045516  052103  020104  042120
                045524  020122  020064  020040
                045532  051520  020127  020040
                045540  020040  042524  052123
                045546  047516  020040  051105
                045554  047522  050122  000103
3278            045562  051123  020062  040527  DH31:   .ASCIZ  /SR2 WAS EXPECTD PDR 4   PSW     TESTNO  ERRORPC/
                045570  020123  054105  042520
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                045576  052103  020104  042120
                045604  020122  020064  020040
                045612  051520  020127  020040
                045620  020040  042524  052123
                045626  047516  020040  051105
                045634  047522  050122  000103
3279            045642  027126  027102  027101  DH32:   .ASCIZ  /V.B.A.  KIPDR4  SR0 WAS SR2 WAS TESTNO  ERRORPC/
                045650  020040  044513  042120
                045656  032122  020040  051123
                045664  020060  040527  020123
                045672  051123  020062  040527
                045700  020123  042524  052123
                045706  047516  020040  051105
                045714  047522  050122  000103
3280            045722  027126  027102  027101  DH33:   .ASCIZ  /V.B.A.  KIPDR4  TESTNO  ERRORPC/
                045730  020040  044513  042120
                045736  032122  020040  042524
                045744  052123  047516  020040
                045752  051105  047522  050122
                045760  000103
3281            045762  027126  027102  027101  DH34:   .ASCIZ  /V.B.A.  KIPDR4  SR0 WAS EXPECTD TESTNO  ERRORPC/
                045770  020040  044513  042120
                045776  032122  020040  051123
                046004  020060  040527  020123
                046012  054105  042520  052103
                046020  020104  042524  052123
                046026  047516  020040  051105
                046034  047522  050122  000103
3282            046042  027126  027102  027101  DH35:   .ASCIZ  /V.B.A.  KIPDR4  SR2 WAS EXPECTD TESTNO  ERRORPC/
                046050  020040  044513  042120
                046056  032122  020040  051123
                046064  020062  040527  020123
                046072  054105  042520  052103
                046100  020104  042524  052123
                046106  047516  020040  051105
                046114  047522  050122  000103
3283            046122  051123  020062  040527  DH36:   .ASCIZ  /SR2 WAS EXPECTD TESTNO  ERRORPC/
                046130  020123  054105  042520
                046136  052103  020104  042524
                046144  052123  047516  020040
                046152  051105  047522  050122
                046160  000103
3284            046162  044506  051522  020124  DH37:   .ASCII  /FIRST ABORT     SECOND ABORT/<CRLF>
                046170  041101  051117  020124
                046176  020040  020040  042523
                046204  047503  042116  040440
                046212  047502  052122     200
3285            046217     123  030122  053440           .ASCIZ  /SR0 WAS SR2 WAS SR0 WAS SR2 WAS TESTNO  ERRORPC/
                046224  051501  051440  031122
                046232  053440  051501  051440
                046240  030122  053440  051501
                046246  051440  031122  053440
                046254  051501  052040  051505
                046262  047124  020117  042440
                046270  051122  051117  041520
                046276     000
```

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3286  046277  123     030122  053440  DH40:   .ASCIZ  /SR0 WAS SR2 WAS TESTNO  ERRORPC/
      046304  051501  051440  031122
      046312  053440  051501  052040
      046320  051505  047124  020117
      046326  042440  051122  051117
      046334  041520  000
3287  046337  120     053523  053440  DH42:   .ASCIZ  /PSW WAS R6 WAS  TESTNO  ERRORPC/
      046344  051501  051040  020066
      046352  040527  020123  052040
      046360  051505  047124  020117
      046366  042440  051122  051117
      046374  041520  000
3288  046377  105     050130  041505  DH44:   .ASCII  /EXPECTED         RECEIVED/<CRLF>
      046404  042524  020104  020040
      046412  020040  020040  02004C
      046420  042522  042503  053111
      046426  042105  200
3289  046431  123     030122  020040          .ASCIZ  /SR0     SR2     SR0 WAS SR2 WAS TESTNO  ERRORPC/
      046436  020040  051440  031122
      046444  020040  020040  051440
      046452  030122  053440  051501
      046460  051440  031122  053440
      046466  051501  052040  051505
      046474  047124  020117  042440
      046502  051122  051117  041520
      046510  000
3290  046511  105     050130  041505  DH45:   .ASCII  /EXPECTED:/<CRLF>
      046516  042524  035104  200
3291  046523  120     053523  020040          .ASCII  /PSW     PC      SR0     SR2/<CRLF>
      046530  020040  050040  020103
      046536  020040  020040  051440
      046544  030122  020040  020040
      046552  051440  031122  200
3292  046557  061     030067  030460          .ASCII  /170017  (3$+4)  020147  (3$)/<CRLF>
      046564  020067  024040  022063
      046572  032053  020051  030040
      046600  030062  032061  020067
      046606  024040  022063  100051
3293  046614  042522  042503  053111          .ASCII  /RECFIVED:/<CRLF>
      046622  042105  100072
3294  046626  051520  020127  020040          .ASCIZ  /PSW     PC      SR0     SR2     TESTNO  ERRORPC/
      046634  020040  041520  020040
      046642  020040  020040  051123
      046650  020060  020040  020040
      046656  051123  020062  020040
      046664  020040  042524  052123
      046672  047516  020040  051105
      046700  047522  050122  000103
3295  046706  040504  040524  020040  DH46:   .ASCII  /DATA    DATA/<CRLF>
      046714  020040  040504  040524
      046722  200
3296  046723  105     050130  041505          .ASCIZ  /EXPECTD RECEIVD TESTNO  ERRORPC/
      046730  042124  051040  041505
      046736  044505  042126  052040
      046744  051505  047124  020117
      046752  042440  051122  051117
```

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                046760  041520     000
3297            046763     124  051505  047124  DH50:   .ASCIZ  /TESTNO  ERRORPC/
                046770  020117  042440  051122
                046776  051117  041520     000
3298            047003     123  030122  053440  DH51:   .ASCIZ  /SR0 WAS SR2 WAS TESTNO  ERRORPC/
                047010  051501  051440  031122
                047016  053440  051501  052040
                047024  051505  047124  020117
                047032  042440  051122  051117
                047040  041520     000
3299            047043     120  054510  044523  DH52:   .ASCII  /PHYSICL PAR 4/<CRLF>
                047050  046103  050040  051101
                047056  032040     200
3300            047061     101  042104  042522          .ASCIZ  /ADDRESS V.B.A.  PAR 4   SR0 WAS SR2 WAS PSW     TESTNO  ERRORPC/
                047066  051523  053040  041056
                047074  040456  020056  050040
                047102  051101  032040  020040
                047110  051440  030122  053440
                047116  051501  051440  031122
                047124  053440  051501  050040
                047132  053523  020040  020040
                047140  052040  051505  047124
                047146  020117  042440  051122
                047154  051117  041520     000
3301            047161     120  053523  053440  DH56:   .ASCIZ  /PSW WAS EXPECTD TESTNO  ERRORPC/
                047166  051501  042440  050130
                047174  041505  042124  052040
                047202  051505  047124  020117
                047210  042440  051122  051117
                047216  041520     000
3302
3303                    047222                          .EVEN
3304
3305            047222  001266  001270  001264  DT1:    .WORD   TRAPPC,TRAPPS,WASR6,TESTNO,$ERRPC,0
                047230  001262  001116  000000
3306            047236  001266  001270  001264  DT2:    .WORD   TRAPPC,TRAPPS,WASR6,WASSR0,WASSR2,TESTNO,$ERRPC,0
                047244  001272  001274  001262
                047252  001116  000000
3307            047256  001162  001164  001262  DT3:    .WORD   $REG0,$REG1,TESTNO,$ERRPC,0
                047264  001116  000000
3308            047270  001162  001262  001116  DT7:    .WORD   $REG0,TESTNO,$ERRPC,0
                047276  000000
3309            047300  001300  001302  001304  DT10:   .WORD   ANDADR,ORADR,TONUM,TESTNO,$ERRPC,0
                047306  001262  001116  000000
3310            047314  001162  001164  001164  DT11:   .WORD   $REG0,$REG1,$REG1,TESTNO,$ERRPC,0
                047322  001262  001116  000000
3311            047330  001162  001164  001166  DT12:   .WORD   $REG0,$REG1,$REG2,$REG2,TESTNO,$ERRPC,0
                047336  001166  001262  001116
                047344  000000
3312            047346  001162  001262  001116  DT13:   .WORD   $REG0,TESTNO,$ERRPC,0
                047354  000000
3313            047356  001162  001164  001174  DT16:   .WORD   $REG0,$REG1,$REG5,$REG2,TESTNO,$ERRPC,0
                047364  001166  001262  001116
                047372  000000
3314            047374  001312  001306  001172  DT17:   .WORD   PSALO,VIRT1,$REG4,TESTNO,$ERRPC,0
                047402  001262  001116  000000
```

```
3315  047410  001312  001306  001310  DT20:   .WORD   PBALO,VIRT1,VIRT2,$REG4,$REG5,$TMP0,TESTNO,$ERRPC,0
      047416  001172  001174  001176
      047424  001262  001116  000000
3316  047432  001174  001170  001262  DT21:   .WORD   $REG5,$REG3,TESTNO,$ERRPC,0
      047440  001116  000000
3317  047444  001162  001174  001170  DT22:   .WORD   $REG0,$REG5,$REG3,TESTNO,$ERRPC,0
      047452  001262  001116  000000
3318  047460  001174  001262  001116  DT23:   .WORD   $REG5,TESTNO,$ERRPC,0
      047466  000000
3319  047470  001166  001164  001262  DT24:   .WORD   $REG2,$REG1,TESTNO,$ERRPC,0
      047476  001116  000000
3320  047502  001166  001176  001262  DT26:   .WORD   $REG2,$TMP0,TESTNO,$ERRPC,0
      047510  001116  000000
3321  047514  001272  001170  001166  DT30:   .WORD   WASSR0,$REG3,$REG2,$TMP0,TESTNO,$ERRPC,0
      047522  001176  001262  001116
      047530  000000
3322  047532  001274  001172  001166  DT31:   .WORD   WASSR2,$REG4,$REG2,$TMP0,TESTNO,$ERRPC,0
      047540  001176  001262  001116
      047546  000000
3323  047550  001162  001172  001272  DT32:   .WORD   $REG0,$REG4,WASSR0,WASSR2,TESTNO,$ERRPC,0
      047556  001274  001262  001116
      047564  000000
3324  047566  001162  001172  001262  DT33:   .WORD   $REG0,$REG4,TESTNO,$ERRPC,0
      047574  001116  000000
3325  047600  001162  001172  001272  DT34:   .WORD   $REG0,$REG4,WASSR0,$REG2,TESTNO,$ERRPC,0
      047606  001166  001262  001116
      047614  000000
3326  047616  001162  001172  001274  DT35:   .WORD   $REG0,$REG4,WASSR2,$REG3,TESTNO,$ERRPC,0
      047624  001170  001262  001116
      047632  000000
3327  047634  001274  001164  001262  DT36:   .WORD   WASSR2,$REG1,TESTNO,$ERRPC,0
      047642  001116  000000
3328  047646  001176  001202  001272  DT37:   .WORD   $TMP0,$TMP2,WASSR0,WASSR2,TESTNO,$ERRPC,0
      047654  001274  001262  001116
      047662  000000
3329  047664  001272  001274  001262  DT40:   .WORD   WASSR0,WASSR2,TESTNO,$ERRPC,0
      047672  001116  000000
3330  047676  001164  001166  001262  DT42:   .WORD   $REG1,$REG2,TESTNO,$ERRPC,0
      047704  001116  000000
3331  047710  001162  001164  001272  DT44:   .WORD   $REG0,$REG1,WASSR0,WASSR2,TESTNO,$ERRPC,0
      047716  001274  001262  001116
      047724  000000
3332  047726  001164  001170  001272  DT45:   .WORD   $REG1,$REG3,WASSR0,WASSR2,TESTNO,$ERRPC,0
      047734  001274  001262  001116
      047742  000000
3333  047744  001162  001164  001262  DT46:   .WORD   $REG0,$REG1,TESTNO,$ERRPC,0
      047752  001116  000000
3334  047756  001262  001116  000000  DT50:   .WORD   TESTNO,$ERRPC,0
3335  047764  001272  001274  001262  DT51:   .WORD   WASSR0,WASSR2,TESTNO,$ERRPC,0
      047772  001116  000000
3336  047776  001312  001306  001172  DT52:   .WORD   PBALO,VIRT1,$REG4,WASSR0,WASSR2,$TMP0,TESTNO,$ERRPC,0
      050004  001272  001274  001176
      050012  001262  001116  000000
3337  050020  001164  001166  001262  DT56:   .WORD   $REG1,$REG2,TESTNO,$ERRPC,0
      050026  001116  000000
3338
```

```
3339  050032  000  000  000  DF1:   .BYTE  0,0,0,0,0
      050035  000  000
3340  050037  000  000  000  DF2:   .BYTE  0,0,0,0,0,0,0
      050042  000  000  000
      050045  000
3341  050046  000  000  000  DF3:   .BYTE  0,0,0,0
      050051  000
3342  050052  000  000  000  DF7:   .BYTE  0,0,0
3343  050055  000  000  001  DF10:  .BYTE  0,0,1,0,0
      050060  000  000
3344  050062  000  000  002  DF11:  .BYTE  0,0,2,0,0
      050065  000  000
3345  050067  000  000  000  DF12:  .BYTE  0,0,0,2,0,0
      050072  002  000  000
3346  050075  000  000  000  DF13:  .BYTE  0,0,0
3347  050100  000  000  000  DF16:  .BYTE  0,0,0,0,0,0
      050103  000  000  000
3348  050106  003  000  000  DF17:  .BYTE  3,0,0,0,0
      050111  000  000
3349  050113  003  000  000  DF20:  .BYTE  3,0,0,0,0,0,0,0
      050116  000  000  000
      050121  000  000
3350  050123  000  000  000  DF21:  .BYTE  0,0,0,0
      050126  000
3351  050127  000  000  000  DF22:  .BYTE  0,0,0,0,0
      050132  000  000
3352  050134  000  000  000  DF23:  .BYTE  0,0,0
3353  050137  000  000  000  DF24:  .BYTE  0,0,0,0
      050142  000
3354  050143  000  000  000  DF30:  .BYTE  0,0,0,0,0,0
      050146  000  000  000
3355  050151  000  000  000  DF46:  .BYTE  0,0,0,0
      050154  000
3356  050155  000  000       DF50:  .BYTE  0,0
3357  050157  000  000  000  DF51:  .BYTE  0,0,0,0
      050162  000
3358  050163  003  000  000  DF52:  .BYTE  3,0,0,0,0,0,0,0
      050166  000  000  000
      050171  000  000
3359  050173  000  000  000  DF56:  .BYTE  0,0,0,0
      050176  000
3360
3361        000001                    .END
```

```
ABASE = 000000              261
ACDW1 = 000000              261
ACDW2 = 000000              261
ACPUOP= 000000              261
ADDW0 = 000000              261
ADDW1 = 000000              261
ADDW10= 000000              261
ADDW11= 000000              261
ADDW12= 000000              261
ADDW13= 000000              261
ADDW14= 000000              261
ADDW15= 000000              261
ADDW2 = 000000              261
ADDW3 = 000000              261
ADDW4 = 000000              261
ADDW5 = 000000              261
ADDW6 = 000000              261
ADDW7 = 000000              261
ADDW8 = 000000              261
ADDW9 = 000000              261
ADEVCT= 000000              261
ADEVM = 000000              261
AENV  = 000000              261
AENVM = 000000              261
AFATAL= 000000              261
AMADR1= 000000              261
AMADR2= 000000              261
AMADR3= 000000              261
AMADR4= 000000              261
AMAMS1= 000000              261
AMAMS2= 000000              261
AMAMS3= 000000              261
AMAMS4= 000000              261
AMSGAD= 000000              261
AMSGLG= 000000              261
AMSGTY= 000000              261
AMTYP1= 000000              261
AMTYP2= 000000              261
AMTYP3= 000000              261
AMTYP4= 000000              261
ANDADR  001300              261#    781*    805*    813*    819*    825*    831*   3309
APASS = 000000              261
APRIOR= 000000              261
APTCSU= 000040             3192    3193#
APTENV= 000001             2897    3192    3193#
APTSIZ= 000200              626    3193#
APTSPO= 000100             3192    3193#
ASWREG= 000000              261
ATESTN= 000000              261
AUNIT = 000000              261
AUSWR = 000000              261
AVECT1= 000000              261
AVECT2= 000000              261
BIT0  = 000001               21#   1262
BIT00 = 000001               21#
BIT01 = 000002               21#
```

```
BIT02 = 000004              21#
BIT03 = 000010              21#
BIT04 = 000020              21#
BIT05 = 000040              21#
BIT06 = 000100              21#
BIT07 = 000200              21#
BIT08 = 000400              21#   2896
BIT09 = 001000              21#   2896    2897
BIT1  = 000002              21#
BIT10 = 002000              21#   2897
BIT11 = 004000              21#   2896
BIT12 = 010000              21#   2881
BIT13 = 020000              21#   2897
BIT14 = 040000              21#   2896
BIT15 = 100000              21#    864
BIT2  = 000004              21#
BIT3  = 000010              21#
BIT4  = 000020              21#     25
BIT5  = 000040              21#
BIT6  = 000100              21#     26
BIT7  = 000200              21#
BIT8  = 000400              21#
BIT9  = 001000              21#
BPTVEC= 000014              21#
CKSWR = 104410            2896    2897    3200#
CMPREG  035260            1132    1140    1148    1156    3063#
CMSG    036645            3180    3189#
CNTRLC  036566            3165    3178#
CR    = 000015              21#   3192
CRLF  = 000200               21#   629    3192    3257    3259    3261    3264    3266    3268    3270    3284    3288    3290
                          3291    3292    3293    3295    3299
DALTB1  026764            1700    1766#
DALTB2  027020            1715    1784#
DALTB3  027332            1812    1878#
DALTB4  027366            1827    1896#
DDISP = 177570               21#   261    626
DF1     050032             267    3339#
DF10    050055             310    3343#
DF11    050062             317    550    3344#
DF12    050067             324    343    3345#
DF13    050075             330    336    3346#
DF16    050100             350    3347#
DF17    050106             357    3348#
DF2     050037             273    3340#
DF20    050113             364    3349#
DF21    050123             371    3350#
DF22    050127             378    3351#
DF23    050134             384    480    3352#
DF24    050137             390    396    402    408    432    449    462    468    474    3353#
DF3     050046             279    285    291    297    3341#
DF30    050143             414    420    426    438    443    456    488    498    3354#
DF46    050151             505    512    537    3355#
DF50    050155             518    543    3356#
DF51    050157             524    3357#
DF52    050163             531    3358#
DF56    050173             556    3359#
```

```
DF7     050052          303    3342#
DH1     044015          265    3253#
DH10    044245          307    3257#
DH11    044345          314     547    3259#
DH12    044465          321     340    3261#
DH13    044625          328     334    3263#
DH16    044655          347    3264#
DH17    044755          354    3266#
DH2     044065          271    3254#
DH20    045045          361    3268#
DH21    045173          368    3270#
DH22    045253          375    3272#
DH23    045352          382     478    3274#
DH24    045402          388     394    3275#
DH26    045442          400     406    3276#
DH3     044155          277     283     289     295    3255#
DH30    045502          412    3277#
DH31    045562          418    3278#
DH32    045642          424    3279#
DH33    045722          430    3280#
DH34    045762          436    3281#
DH35    046042          441    3282#
DH36    046122          447     466    3283#
DH37    046162          453    3284#
DH40    046277          460    3286#
DH42    046337          472    3287#
DH44    046377          485    3288#
DH45    046511          492    3290#
DH46    046706          502     509     534    3295#
DH50    046763          516     541    3297#
DH51    047003          522    3298#
DH52    047043          528    3299#
DH56    047161          554    3301#
DH7     044215          301    3256#
DISPLA  001142          261#    626*   2896*   2897*
DISPRE  000174          258#    626
DOAGIN  034030         2861    2872#
DSWR  = 177570           21#    261     626
DT1     047222          266    3305#
DT10    047300          309    3309#
DT11    047314          316     549    3310#
DT12    047330          323     342    3311#
DT13    047346          329     335    3312#
DT16    047356          349    3313#
DT17    047374          356    3314#
DT2     047236          272    3306#
DT20    047410          363    3315#
DT21    047432          370    3316#
DT22    047444          377    3317#
DT23    047460          383     479    3318#
DT24    047470          389     395    3319#
DT26    047502          401     407    3320#
DT3     047256          278     284     290     296    3307#
DT30    047514          413    3321#
DT31    047532          419    3322#
DT32    047550          425    3323#
```

```
DT33    047566          431   3324#
DT34    047600          437   3325#
DT35    047616          442   3326#
DT36    047634          448    467    3327#
DT37    047646          455   3328#
DT40    047664          461   3329#
DT42    047676          473   3330#
DT44    047710          487   3331#
DT45    047726          497   3332#
DT46    047744          504    511    536    3333#
DT50    047756          517    542   3334#
DT51    047764          523   3335#
DT52    047776          530   3336#
DT56    050020          555   3337#
DT7     047270          302   3308#
EMTVEC= 000030           21#   626*
EM1     040724          264   3208#
EM10    041303          306   3215#
EM11    041347          313   3216#
EM12    041407          320   3217#
EM13    041456          327   3218#
EM14    041513          333   3219#
EM15    041546          339   3220#
EM16    041622          346   3221#
EM17    041664          353   3222#
EM2     040764          270   3209#
EM20    041722          360   3223#
EM21    041774          367   3224#
EM22    042031          374   3225#
EM23    042070          381   3226#
EM24    042134          387   3227#
EM25    042174          393   3228#
EM26    042237          399   3229#
EM27    042307          405   3230#
EM3     041033          276   3210#
EM30    042356          411   3231#
EM31    042430          417    440    446    3232#
EM32    042475          423   3233#
EM33    042556          429   3234#
EM34    042641          435   3235#
EM37    042717          452   3236#
EM4     041072          282   3211#
EM40    042764          459   3237#
EM41    043033          465   3238#
EM42    043066          471   3239#
EM43    043125          477   3240#
EM44    043174          484   3241#
EM45    043240          491   3242#
EM46    043313          501   3243#
EM47    043356          508   3244#
EM5     041125          288   3212#
EM50    043421          515   3245#
EM51    043457          521   3246#
EM52    043535          527   3247#
EM53    043613          533   3248#
EM54    043656          540   3249#
```

```
EM55    043714            546   3250#
EM56    043752            553   3251#
EM6     041200            294   3213#
EM7     041245            300   3214#
ERRTYP  034654           2897   2918#
ERRVEC= 000004             21#    626*    633*    634*   1496*   1509*   2896*
FORMPA  035452           1251   1252    1253    1271    1294    1319    1320    1321    1322    1387    1440    3139#
GNS   = ****** U          258    629    3200
GTSWR = 104407             629   3185   3200#
HT    = 000011             21#   3192
IOTVEC= 000020             21#    626*
KERSTK= 001100             27#    739     743     745    1130    1138    1146    1154    1498    1705    1727    1817    1839
                         1940   2001    2006    2068    2087    2145    2204    2297    2628    2759
KIPAR0= 172340             22#    813     947    1036    1137    1186    1238   2261*    3040    3078    3140
KIPAR1= 172342             22#   2262*
KIPAR2= 172344             22#   2263*
KIPAR3= 172346             22#   1459    1536*   1927*   2264*
KIPAR4= 172350             22#   1251*   1252*   1253*   1260*   1284*   1319*   1320*   1321*   1322*   1357*   1407*   1417*
                         1426*   1537*   1928*   2265*   2285*   2436*   2614*
KIPAR5= 172352             22#   1358*   1408*   1418*   1427*   1976*
KIPAR6= 172354             22#   1508*
KIPAR7= 172356             22#   2266*
KIPDR0= 172300             22#    819     990    1079    1128    1175    1245    1459    2270    3036    3064
KIPDR1= 172302             22#
KIPDR2= 172304             22#
KIPDR3= 172306             22#   1540*   1698*   1929*
KIPDR4= 172310             22#   1405*   1419*   1423*   1547*   1613*   1708*   1720*   1820*   1832*   1930*   1957*   1977*
                         2047*   2284*   2290*   2434*   2460*   2462*   2477*   2479*   2493*   2495*   2509*   2511*   2527*
                         2529*   2544*   2546*   2563*   2565*   2613*
KIPDR5= 172312             22#   1406*   1420*   1424*   1699*   1978*   2048*
KIPDR6= 172314             22#   1495*   1499    1507*
KIPDR7= 172316             22#   1484*   1487    2136*   2165*
LF    = 000012             21#   3192
LOOP    020464            632#
MGMERR  002150            599#    635    1430    1594    1654    1761    1873    1958    2049    2164    2237    2403    2574
                         2729
MGMFLG  002152            600#    615*    639*
MMVEC = 000250             22#    635*    636*   1372*   1430*   1546*   1594*   1612*   1654*   1703*   1718*   1761*   1815*
                         1830*   1873*   1933*   1958*   1998*   2004*   2049*   2289*   2403*   2438*   2574*   2621*   2729*
ORADR   001302            261#    782*    803*    813*    819*    825*    831*   3309
PBAHI   001314            261#   3159*
PBALO   001312            261#   3150*   3151*   3156*   3314    3315    3336
PDRTB1  027002           1701   1775#
PDRTB2  027034           1716   1792#
PDRTB3  027350           1813   1887#
PDRTB4  027402           1828   1904#
PIRQ  = 177772             21#
PIRQVE= 000240             21#
PR0   = 000000             21#
PR1   = 000040             21#
PR2   = 000100             21#
PR3   = 000140             21#
PR4   = 000200             21#
PR5   = 000240             21#
PR6     000300             21#
PR7   = 000340             21#
```

```
PS     = 177776          21#
PSW    = 177776          21#   677*  678*  679   683*  691*  701*  703*  704   709*  715*  717*  718
                        722*  738*  740*  742*  900*  910*  1256  1280  1354*  1378  1399  1409*  1411*
                       1458*  1465*  1467*  1551  1584*  1590*  1592*  1617  1650*  1652*  2067*  2072*  2079
                       2081*  2086*  2089*  2091*  2106*  2110  2112*  2194*  2203*  2205*  2207*  2294*  2315*
                       2327*  2339*  2350*  2364*  2378*  2391*  2441*  2452*  2473*  2490*  2505*  2522*  2540*
                       2557*  2612*  2623*  2642*  2655*  2667*  2678*  2691*  2705*  2718*  2730*  2756*  2798*
                       2998   3000   3141
PWRMSG  040662         3201   3202#
PWRVEC= 000024          21#    626*  3201*
RDCHR  = 104411        3165   3200#
RDLIN  = 104412        3200#
RESREG= 104414         3198   3200#
RESTRT  020464          631#  2892   3201
RESVEC= 000010          21#    626*
SAVREG= 104413         3198   3200#
SETREG  035166         1129   1173   3035#
SR0    = 177572          22#   611    613*  641*  779   845   901*  903   909*  1251*  1252*  1253*  1262*
                       1285*  1319*  1320*  1321*  1322*  1373*  1441  1443*  1485  1486*  1565  1580*  1631
                       1646*  1728   1744*  1749  1751*  1840  1856*  1861  1863*  1948*  2002  2007  2023
                       2037*  2146   2162*  2200  2202*  2410  2412*  2580  2582*  2737  2739*
SR1    = 177574          22#   921
SR2    = 177576          22#   612    855   876   1442  1566  1632  1729  1750  1841  1862  1941  1980
                       1989   2003   2008  2027  2038  2147  2201  2411  2581  2738
SR3    = 172516          22#   927*   928   932
STACK  = 001100          21#    27     28   626   632  2799  2818
START   020000          258    626#
STKLMT= 177774          21#
SWR     001140         261#   626*   629  2881  2896  2897  3165*  3201*
SWREG   000176         258#   626    629  3165
SW0    = 000001          21#
SW00   = 000001          2'#
SW01   = 000002          21#
SW02   = 000004          21#
SW03   = 000010          21#
SW04   = 000020          21#
SW05   = 000040          21#
SW06   - 000100          21#
SW07   = 000200          21#
SW08   = 000400          21#
SW09   = 001000          21#
SW1    = 000002          21#
SW10   = 002000          21#
SW11   = 004000          21#
SW12   = 010000          21#
SW13   = 020000          21#
SW14   = 040000          21#
SW15   = 100000          21#
SW2    = 000004          21#
SW3    = 000010          21#
SW4    = 000020          21#
SW5    = 000040          21#
SW6    = 000100          21#
SW7    = 000200          21#
SW8    = 000400          21#
SW9    = 001000          21#
```

```
TBIT  = 000020   25#  2998  3003  3016
TBITPS  001276  261#  640*  3001*  3016  3018  3019*
TBITVE= 000014   21#  626*
TESTNO  001262  261#  2897*  3305  3306  3307  3308  3309  3310  3311  3312  3313  3314  3315
                3316  3317  3318  3319  3320  3321  3322  3323  3324  3325  3326  3327  3328
                3329  3330  3331  3332  3333  3334  3335  3336  3337
TIMERR  002076  571#  633  794  813  819  825  831  1509  2092  2163  2235
TIMFLG  002100  572#  584*  638*
TKVEC = 000060   21#
TOFF    035100  1459  1466  1480  2065  2184  2998#
TON     035134  1459  1466  1511  2094  2240  3016#
TONUM   001304  261#  783*  791  806*  813*  819*  825*  831*  3309
TPVEC = 000064   21#
TRAPPC  001266  261#  580*  586  608*  617  1434*  1450  1747*  1757  1859*  1869  2408*  2418
                2578*  2588  2735*  2745  3305  3306
TRAPPS  001270  261#  581*  585  609*  616  1435*  1449  1748*  1756  1860*  1868  2409*  2417
                2579*  2587  2736*  2744  3305  3306
TRAPVE= 000034   21#  626*
TRTVEC= 000014   21#
TST1    020546  652#
TST10   021516  819  824#
TST11   021650  825  830#
TST12   022002  831  843#
TST13   022144  898#
TST14   022202  919#
TST15   022252  933  945#
TST16   022370  988#
TST17   022512  1033#
TST2    020620  674#
TST20   022642  1077#
TST21   022772  1124#
TST22   023176  1170#
TST23   023346  1236#
TST24   024076  1315#
TST25   024466  1352#
TST26   025204  1432  1457#
TST27   025406  1464#
TST3    020704  699#
TST30   025614  1478#
TST31   025762  1533#
TST32   026256  1605#
TST33   026466  1697#
TST34   027050  1763  1811#
TST35   027416  1875  1926#
TST36   027610  1975#
TST37   030212  2064#
TST4    021026  737#
TST40   030400  2102#
TST41   030462  2134#
TST42   030632  2183#
TST43   031154  2260#
TST44   032022  2405  2433#
TST45   032702  2575  2604#
TST46   033446  2732  2755#
TST47   033552  2797#
TST5    021074  744  775#
```

```
TST6    021232            795    812#
TST7    021364            813    818#
TYPBN = 104406           2962   3200#
TYPDS = 104405           2850   2858   2956   3184   3200#
TYPE  = 104401            629   2847   2851   2859   2897   2919   2934   2936   2939   2941   2970   2975   2981
                         3165   3180   3183   3192   3194   3195   3196   3200#  3201
TYPOC = 104402           2925   2950   3165   3182   3200#
TYPON = 104404           3200#
TYPOS = 104403           3200#
UIPAR0= 177640             22#   825    976   1066   1153   1209   1359   2069*  2088*  2277*  3048   3106   3143
UIPAR1= 177642             22#  2278*
UIPAR2= 177644             22#  2279*
UIPAR3= 177646             22#  1466   1538*  2185*  2280*
UIPAR4= 177650             22#  1376*  1401*  1428*  1539*  2186*  2286*  2437*  2615*
UIPAR5= 177652             22#  1377*  1402*  1429*
UIPAR6= 177654             22#
UIPAR7= 177656             22#   974   1064   2281*
UIPDR0= 177600             22#   831   1020   1109   1145   1197   1366   1466   2274   2608   3044   3092
UIPDR1= 177602             22#
UIPDR2= 177604             22#
UIPDR3= 177606             22#  1541*  2187*  2238*
UIPDR4= 177610             22#  1374*  1403*  1548*  1614*  2188*  2435*  2622*
UIPDR5= 177612             22#  1375*  1404*
UIPDR6= 177614             22#
UIPDR7= 177616             22#  1018   1107
USESTK= 000700             28#   741   2073   2090   2206   2300   2453   2625   2762   2785
VIRT1   001306            261#  1251*  1252*  1253*  1270*  1293*  1319*  1320*  1321*  1322*  1386*  1394   1439*
                         3144   3150   3314   3315   3336
VIRT2   001310            261#  1385*  3315
WASR6   001264            261#   582*   610*  3305   3306
WASR0   001272            261#   611*  1441*  1565*  1567   1631*  1633   1728*  1731   1749*  1840*  1843   1861*
                         2007*  2009   2023*  2024   2146*  2149   2200*  2219   2410*  2580*  2737*  3306   3321
                         3323   3325   3328   3329   3331   3332   3335   3336
WASR2   001274            261#   612*   855*   857    876*   877   1442*  1566*  1574   1632*  1640   1729*  1738
                         1750*  1841*  1850   1862*  1941*  1942   1980*  1982   1989*  1991   2008*  2012   2027*
                         2028   2038*  2040   2147*  2156   2201*  2222   2411*  2581*  2738*  3306   3322   3323
                         3326   3327   3328   3329   3331   3332   3335   3336
WBIT  = 000100             26#  1459   1466
$APTHD  000204            260#
$ASTAT= ****** U          3193
$ATYC   037224            3193#
$ATY1   037200            3193#
$ATY3   037206            3192   3193#
$ATY4   037216            2897   3193#
$AUTOB  001134            261#   629*   3165
$BDADR  001122            261#
$BDDAT  001126            261#
$BELL   001216            261#   2897
$BIN    037520           3194#*
$CHARC  037174           3192#*
$CKSWR  035574            3165#  3200
$CLR.T  034016            2863   2866#
$CMTAG  001100            261#    626
$CM1  = 000006            261#
$CM2  = 000014            261#
$CM3  - 000006            261#
```

```
$CM4  = 000006  261#
$CNTLC  036524  3165#
$CNTLG  036536  3165#
$CNTLU  036531  3165#
$CPUOP  001254  261#
$CRLF  001223  261#  2859  2897  2919  2936  2941  2981  3165  3192
$DBLK  040164  3196#
$DB20  040270  2967  3198#
$DEVCT  001236  261#
$DOAGN  034066  2839  2878#
$DTBL  040154  3196#
$ENDAD  034020  259  629  2867#  2897
$ENDCT  033650  626  2841#
$ENULL  034132  2894#
$ENV  001246  261#  629  2897  3192  3193
$ENVM  001247  261#  626  3192  3193
$EOP  033614  2831#  3186
$EOPCT  033642  626*  2838#  2842
$ERFLG  001103  261#  2896*  2897*
$ERMAX  001115  261#  626*  2896*
$ERROR  034416  626  2897#
$ERRPC  001116  261#  2897*  2925  3305  3306  3307  3308  3309  3310  3311  3312  3313  3314
                3315  3316  3317  3318  3319  3320  3321  3322  3323  3324  3325  3326  3327
                3328  3329  3330  3331  3332  3333  3334  3335  3336  3337
$ERRTB  001316  261#  2931
$ERTTL  001112  261#  628*  2856  2897*
$ESCAP  001214  261#  626*  2896*  2897
$ETABL  001246  261#
$ETEND  001262  260  261#
$FATAL  001230  261#  3193*
$FFLG  037444  3193#*
$FILLC  001156  261#  3192
$FILLS  001155  261#  3192
$GDADR  001120  261#
$GDDAT  001124  261#
$GET42  034000  2860#
$GTSWR  035644  3165#  3200
$HD  = 000000  19
$HIBTS  000204  260#
$ICNT  001104  261#  2896*
$ILLUP  040654  3201#
$INTAG  001135  261#  3165
$ITEMB  001114  261#  2897*  2922
$LF  001224  261#  2897  3165  3192
$LFLG  037443  3193#*
$LOOP  034124  2886  2890#
$LPADR  001106  261#  626*  2896*
$LPERR  001110  261#  626*  653*  668*  675*  6c0*  700*  714*  727*  777*  790*  813*  819*
                825*  831*  854*  863*  887*  9.9*  958*  978*  992*  1001*  1022*  1037*  1050*
                1068*  1080*  1093*  1111*  1126*  1135*  1143*  1151*  1159*  1251*  1252*  1253*  1255*
                1279*  1302*  1319*  1320*  1321*  1322*  1323*  1371*  1431*  1459*  1466*  1482*  1494*
                1510*  1549*  1593*  1615*  1653*  1704*  1717*  1760*  1816*  1829*  1872*  1934*  1956*
                1979*  1988*  1997*  2046*  2066*  2093*  2104*  2119*  2139*  2166*  2193*  2239*  2282*
                2293*  2313*  2326*  2338*  2349*  2363*  2377*  2390*  2404*  2456*  2472*  2489*  2504*
                2521*  2539*  2556*  2573*  2611*  2641*  2654*  2666*  2677*  2690*  2704*  2717*  2731*
                2774*  2787*  2896*  2897
```

```
$MADR1  001260          261#  1413
$MAIL   001226          260    261#   626    629   2896   2897   3192
$MAMS1  001256          261#
$MBADR  000206          260#
$MFLG   037442         3193#*
$MNEW   036554         3165#
$MSGAD  001242          261#  3193*
$MSGLG  001244          261#  3193*
$MSGTY  001226          261#   574*   602*  3193*
$MSWR   036543         3165#
$MTYP1  001257          261#
$MXCNT  034414         2896#
$NULL   001154          261#  3192
$NWTST= 000001          652#   674#   699#   737#   775#   812#   818#   824#   830#   843#   898#   919#   945#
                        988#  1033#  1077#  1124#  1170#  1236#  1315#  1352#  1457#  1464#  1478#  1533#  1605#
                       1697#  1811#  1926#  1975#  2064#  2102#  2134#  2183#  2260#  2433#  2604#  2755#  2797#
$OCNT   037744         3195#*
$OCTVL  040372         3198#
$OMODE  037746         3195#*
$OVER   034400         2896#
$PASS   001234          261#   626*  2835*  2836*  2848   2896   3178
$PASTM  000212          260#
$PWRAD  040636         3201#
$PWRDN  040476          626   3201#
$PWRMG  040632         3201#
$PWRUP  040550         3201#
$QUES   001222          261#  2897   3165   3192
$RDCHR  036116         3165#  3200
$RDDEC= ****** U       3200
$RDLIN  036236         3165#  3200
$RDOCT= ****** U       3200
$RDSZ = 000010         3165#
$REGAD  001160          261#
$REG0   001162          261#  2897*  3307   3308   3310   3311   3312   3313   3317   3323   3324   3325   3326
                       3331   3333
$REG1   001164          261#  2897*  3307   3310   3311   3313   3319   3327   3330   3331   3332   3333   3337
$REG2   001166          261#  2897*  3311   3313   3319   3320   3321   3322   3325   3330   3337
$REG3   001170          261#  2897*  3316   3317   3321   3326   3332
$REG4   001172          261#  2897*  3314   3315   3322   3323   3324   3325   3326   3336
$REG5   001174          261#  2897*  3313   3315   3316   3317   3318
$RESRE  040232         3197#  3200
$RTNAD  034126         2892#
$RTRN   034122          626*  2864   2887#
$R2A  = ****** U       3200
$SAVRE  040174         3197#  3200
$SAVR6  040660         3201#*
$SCOPE  034136          626   2896#
$SETUP= 000137          257#   626    629   2896   2897   3165   3201
$STUP = 177777          257#
$SVLAD  034344         2896#
$SVPC = 000204          259#
$SWR  = 177400           15#    19     20    261    626    652    674    699    737    775    812    818    824
                        830    843    898    919    945    988   1033   1077   1124   1170   1236   1315   1352
                       1457   1464   1478   1533   1605   1697   1811   1926   1975   2064   2102   2134   2183
                       2260   2433   2604   2755   2797   2896   2897   3201
$SWREG  001250          261#   626
```

```
$SWRMK= 000000            20   2896
$TBIT   034130           626*  2883*  2893#  3201*
$TESTN  001232           261#  2896*
$TIMES  001212           261#   626*  2834*  2896*
$TKB    001146           261#  3165
$TKS    001144           261#  3165*
$TMP0   001176           261#  1251*  1252*  1253*  1319*  1320*  1321*  1322*  1378*  1551*  1581  1617*  1647
                        2002*  2009   2208*  2214*  2218*  2221*  2225*  2226   2872*  2877   3315  3320   3321
                        3322   3328   3336
$TMP1   001200           261#  1999*  2011*  2014*  2015   2021*  2026*  2030*  2031
$TMP2   001202           261#  2003*  2012   2365*  2366   2392*  2393   2524   2525*  2559*  2561  2692*  2693
                        2719*  2720   3328
$TMP3   001204           261#
$TMP4   001206           261#
$TMP5   001210           261#  3178*  3179*  3184
$TN   = 000050            16#    19    652#   674#   699#   737#   744    775#   795    812#   813   818#   819
                         824#   825    830#   831    843#   898#   919#   933    945#   988#  1033#  1077#  1124#
                        1170#  1236#  1315#  1352#  1432   1457#  1464#  1478#  1533#  1605#  1697#  1811#  1926#
                        1975#  2064#  2102#  2134#  2183#  2260#  2405   2433#  2575   2604#  2732   2755#  2797#
$TPB    001152           261#  3192*
$TPFLG  001157           261#  3192
$TPS    001150           261#  3192
$TRAP   040410           626   3200#
$TRAP2  040432          3200#
$TRP  = 000015          3200#
$TRPAD  040444          3200#
$TSTM   000210           260#
$TSTNM  001102           261#  2833*  2896*  2897   3181
$TTYIN  036514          3165#
$TYPBN  037446          3194#  3200
$TYPDS  037750          3196#  3200
$TYPE   036716          3192#  3193   3200
$TYPEC  037130          3165   3192#
$TYPEX  037176          3192#
$TYPOC  037546          3195#  3200
$TYPON  037562          3195#  3200
$TYPOS  037522          3195#  3200
$UNIT   001240           261#
$UNITM  000214           260#
$USWR   001252           261#
$XTSTR  034150          2896#
$OFILL  037745          3195#*
$40CAT= ****** U        2896   2897
.     = 050177           258#   259#   260#   261#   624#   626    629#  2846#  2854#  2895#  2896  2897  2984#
                        3165#  3192   3193#  3196#  3198#  3201   3203#  3303#
.$ASTA= ****** U        3193
.$X     000204           260#
```

```
ADDTST   145#  1251  1252  1253  1319  1320  1321  1322
COMMEN    21#
ENDCOM    21#
ERROR     21#   583   614   661   684   710   723   747   793   798   813   819   825   831   850
          859   871   880   905   923   930   934   953   965   996  1009  1046  1058  1089  1101
         1180  1191  1202  1214  1251  1252  1253  1272  1295  1319  1320  1321  1322  1388  1444
         1459  1466  1490  1503  1553  1561  1569  1576  1619  1627  1635  1642  1722  1733  1740
         1752  1834  1845  1852  1864  1944  1984  1993  2017  2033  2042  2082  2115  2141  2151
         2158  2228  2303  2308  2321  2333  2344  2356  2371  2384  2399  2413  2448  2466  2484
         2499  2515  2533  2550  2569  2583  2631  2636  2649  2661  2672  2684  2698  2711  2725
         2740  2765  2770  2781  2807  2814  3072  3086  3100  3114
ESCAPE    21#
GETPRI    21#
GETSWR    21#   629#
MSG1     646#   652
MSG10    821#   824
MSG11    827#   830
MSG12    833#   843
MSG13    889#   898
MSG14    912#   919
MSG15    936#   945
MSG16    980#   988
MSG17   1026#  1033
MSG2     670#   674
MSG20   1070#  1077
MSG21   1113#  1124
MSG21A  1161#  1170
MSG22   1220#  1236
MSG23   1304#  1315
MSG24   1325#  1352
MSG25   1454#  1457
MSG26   1461#  1464
MSG27   1469#  1478
MSG3     693#   699
MSG30   1525#  1533
MSG31   1597#  1605
MSG32   1685#  1697
MSG33   1799#  1811
MSG34   1912#  1926
MSG35   1961#  1975
MSG36   2052#  2064
MSG36A  2096#  2102
MSG37   2121#  2134
MSG4     729#   737
MSG40   2168#  2183
MSG41   2249#  2260
MSG42   2422#  2433
MSG43   2593#  2604
MSG44   2748#  2755
MSG45   2789#  2797
MSG5     765#   775
MSG6     809#   812
MSG7     815#   818
MULT      21#
NEWTST    21#   652   674   699   737   775   812   818   824   830   843   898   919   945   988
         1033  1077  1124  1170  1236  1315  1352  1457  1464  1478  1533  1605  1697  1811  1926
```

```
        1975    2064    2102    2134    2183    2260    2433    2604    2755    2797
POP        9#     21#    3160    3193    3196    3197    3201
PUSH       9#     21#    3139    3193    3196    3197    3201
REPORT    21#
SAVR      62#    2897
SCOPE     21#     652     674     699     737     775     812     818     824     830     843     898     919     945     988
        1033    1077    1124    1170    1236    1315    1352    1457    1464    1478    1533    1605    1697    1811    1926
        1975    2064    2102    2134    2183    2260    2433    2604    2755    2797    2832
SETPRI    21#
SETTRA  3200#
SETUP     21#     626
SKIP      21#     744     795     813     819     825     831     933    1432    2405    2575    2732
SLASH     21#
SPACE     21#
STARS     21#     259     260     261     563     570     591     598     652     674     699     737     752     763     775
         812     818     824     830     843     898     919     945     988    1033    1077    1124    1170    1236    1315
        1352    1457    1464    1478    1513    1523    1533    1605    1667    1682    1697    1811    1926    1975    2064
        2102    2134    2183    2241    2246    2260    2433    2604    2755    2797    2896    2897    2900    2990    2997
        3009    3015    3025    3033    3054    3062    3123    3137    3165    3192    3193    3194    3195    3196    3197
        3198    3200    3201
SWRSU     21#     626#
TIMMSG    83#     812     818     824     830
TIMTST    99#     813     819     825     831
TRMTRP  3200#
TYPBIN    21#    2962
TYPDEC    21#    2956    3184
TYPNAM    21#     629
TYPNUM    21#
TYPOCS    21#
TYPOCT    21#    2925    2950    3165    3182
TYPTXT    21#
USER      41#     261
WMSG     182#    1457    1464
WTST     206#    1459    1466
$$CMRE   261#
$$CMTM   261#
$$ESCA    21#
$$NEWT    21#     652     674     699     737     775     812     818     824     830     843     898     919     945     988
        1033    1077    1124    1170    1236    1315    1352    1457    1464    1478    1533    1605    1697    1811    1926
        1975    2064    2102    2134    2183    2260    2433    2604    2755    2797
$$SET   3200#
$$SETM   626#
$$SETU   626#
$$SKIP    21#     744     795     813     819     825     831     933    1432    2405    2575    2732
.EQUAT     9#      21
.HEADE     9#      19
.KT11      9#      22
.SETUP     9#     257
.SWRHI     9#      20
.SWRLO    20#
.$ACT1    10#     259
.$APTB    13#    261#
.$APTH    13#     260
.$APTY    13#    3193
.$CATC    10#     258
.$CMTA    10#     261
```

```
.$DB20      14#   3198
.$EOP       10#
.$ERRO      11#   2897
.$ERRT      11#
.$POWE      12#   3201
.$READ      13#   3165
.$SAVE      14#   3197
.$SCOP      11#   2896
.$TRAP      12#   3200
.$TYPB      13#   3194
.$TYPD      12#   3196
.$TYPE      11#   3192
.$TYPO      12#   3195


. ABS.  050177     000


 ERRORS DETECTED:  0

 CJKDAC.BIN,CJKDAC.LST/CRF=CJKDAC.P11
 RUN-TIME: 98 54 4 SECONDS
 RUN-TIME RATIO: 332/157=2.1
 CORE USED:  32K  (63 PAGES)
```