KK11-B

11/44 KK11B CACHE
CKKKACO

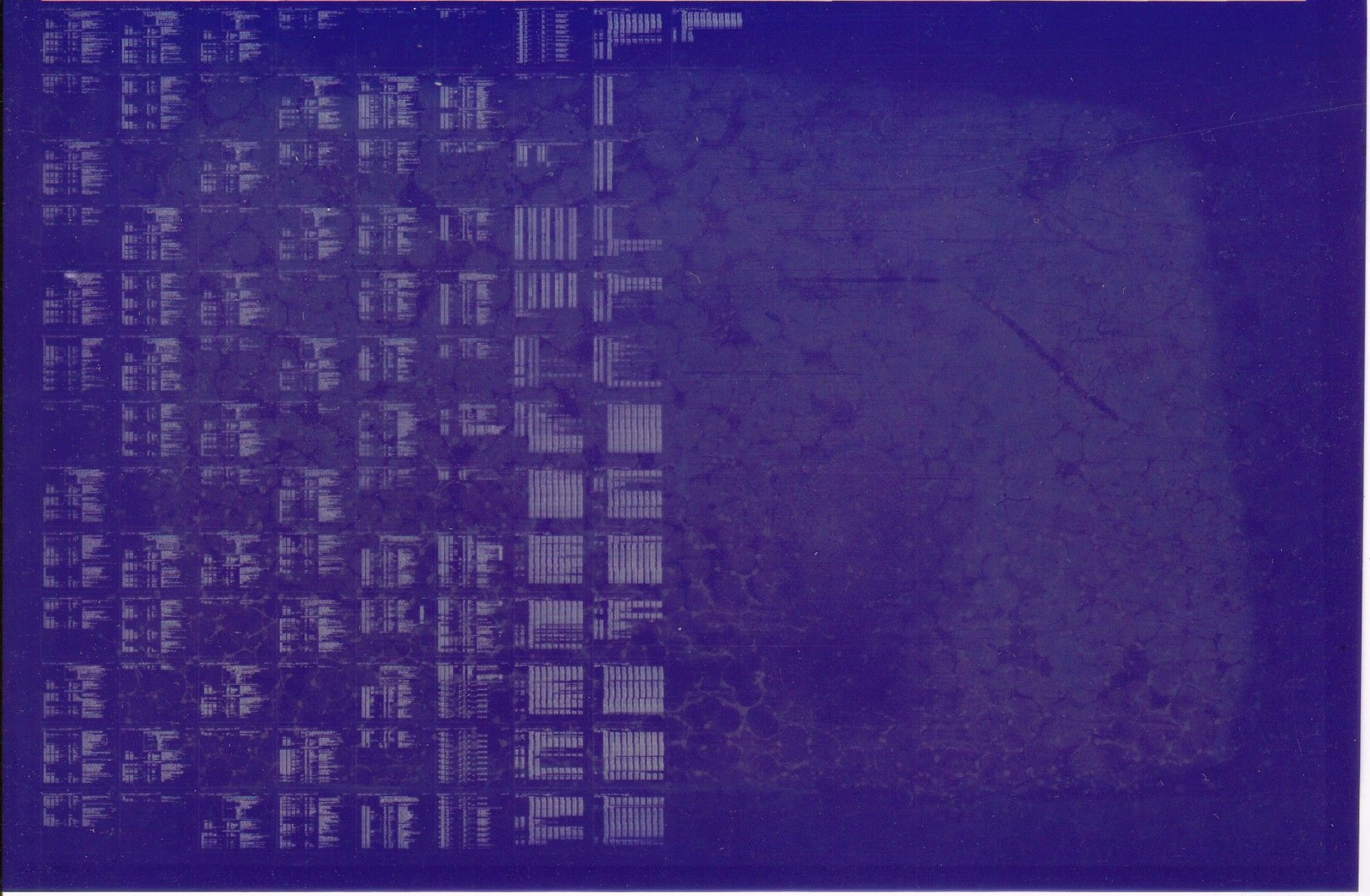
AH-F626C-MC
FICHE 1 OF 2

digital

KK11-B

11/44 KK11B CACHE
CKKKACO

AH-F626C-MC
FICHE 2 OF 2



```
                .REM %
```

IDENTIFICATION

PRODUCT CODE:	AC-F624C-MC
PRODUCT NAME:	CKKKAC0 11/44 KK11B CACHE
DATE CREATED:	APRIL, 1981
MAINTAINER:	DIAGNOSTIC ENGINEERING
AUTHOR:	DAN P. MILLEVILLE

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83                          1.0     HISTORY SECTION
84                                  ---------------
85
86                                  CKKKAAO WAS RELEASED OCT 1979
87                                  CKKKABO WAS RELEASED OCT 1980
88                                  CKKKACO WAS RELEASED APR 1981
89                                          - POWER MONITOR CHECK BEFORE EACH TEST & ON ERROR.
90                                          - NEW SYSMAC VERSION C5 TO CLEAN UP XON-XOFF PROBLEMS.
91                                          - SET ERROR INDICATOR ($MSGTYP) ON ERROR FOR APT.
92                                          - FIXED 10W TEMP PROBLEM WITH TEST 225 - CLEAR CME REGISTER
93                                            BEFORE EACH TEST.
```

2.0 GENERAL PROGRAM INFO

2.1 ABSTRACT

THIS DIAGNOSTIC IS A LOGIC TEST OF THE 11/44 CACHE .
IT IS APT,ACT11,AND XXDP COMPATIBLE.
THIS DIAGNOSTIC ASSOCIATES A GROUP OF TESTS WITH ONE AREA
OF CACHE LOGIC AND PROCEEDS TO TEST THAT AREA COMPREHENSIVELY.
THE MAINTENANCE FEATURES OFFERED BY THE 11/44 CACHE ALLOWS
INFORMATION TO BE READ IN KEY AREAS OF THE CACHE ALLOWING
THE DIAGNOSTIC TO ISOLATE FAILURES TO DATA PATHS ,AND IN SOME
CASES IC'S.

AT THE START OF THE DIAGNOSTIC, A SMALL AREA OF WRITE CONTROL
LOGIC AND THE MAINTENANCE FEATURES ARE ASSUMED TO BE WORKING.
SO EFFECTIVE ARE THE MAINTENANCE FEATURES THAT THE CACHE IS
COMPLETELY TURNED OFF (NO DATA IS ALLOWED TO BE CACHED OUT OF
THE CACHE) AT THE START OF THE DIAGNOSTIC AND NOT TURNED ON
UNTIL 90 PERCENT OF THE DIAGNOSTIC IS COMPLETE.

 TYPICAL TEST SEQUENCE FOR A BLOCK OF LOGIC CONTAINING
RAM IC'S IS TO FIRST VERIFY DATA PATHS TO ONE RAM LOCATION,
VERIFY THAT 0'S AND 1'S CAN BE WRITTEN TO ALL RAM LOCATIONS
,VERIFY ADDRESS LINES TO RAMS, AND FINALLY TO CHECK THE
INTEGRITY OF THE RAMS BY PERFORMING
A MARCH PATTERN TEST.

THE DIAGNOSTIC TESTS WERE DESIGNED IN ASSOCIATION WITH
A M7097 CACHE LOGIC SCHEMATIC. REFERENCE TO THIS DOCUMENT
WILL HELP THE UNDERSTANDING OF THE TEST SEQUENCING AND PURPOSE.

UPON START OF THE PROGRAM, THE CACHE IS IMMEDIATELY TURNED OFF
(FORCE MISS IS ON FOR BOTH HALVES OF CACHE, INTERRUPTS ARE DISABLED
AND CACHE IS IN BYPASS MODE). THE TESTS THEN PROCEED TO SELECTIVELY
TURN ON ONLY THE HALF OF CACHE THAT IS TO BE EXERCISED.
THIS IS TO ENSURE THAT THE INSTRUCTIONS ARE NOT EXECUTED OUT
OF A POSSIBLY BAD CACHE. IN ORDER TO IMPLEMENT THIS SCHEME,
THE TESTS THAT ENABLE CACHE ARE RELOCATED TO AREAS OF CACHE
THAT ARE NOT ENABLED. THE TESTS ARE STRUCTURED ON A HALF CACHE
BASIS. THAT IS A TEST MAY BE RUN IN LOW CACHE WHILE TESTING
HIGH CACHE AFTER WHICH AN IDENTICAL TEST WILL RUN IN HIGH CACHE
WHILE TESTING LOW CACHE.

TO FACILITATE THE TESTING OF CACHE, A 4K BUFFER IS RESERVED AT THE
END OF THE PROGRAM FOR READ WRITE OPERATIONS AND RELOCATION OF TESTS.

2.2 TEST STRUCTURE

EACH TEST IS STRUCTURED WITH THE FOLLOWING DEDICATED LOCAL SYMBOLS:

- 40$: LOCATION WHERE TEST BEGINS
- 1$: LOCATION OF THE BEGINNING OF THE LOOP ON ERROR CODE LOOP
- 25$: LOCATION OF THE END OF THE LOOP ON ERROR CODE LOOP
- 10$: LOCATION WHERE TEST ENDS

THESE LOCATIONS ARE USED BY THE $SCPSET ROUTINE TO SET UP LOOP ON TEST AND LOOP ON ERROR VECTORS (REFER TO $SCPSET SECT. 9.0)

2.3 HARDWARE REQUIREMENTS

2.3.1 REQUIRED EQUIPMENT

1. PDP11-44 CPU
   - A. M7094/M7095 CPU CONTROL DATA PATH
   - B. M7096 MFM
   - C. M7098 UBI
   - D. M7090 CIM
2. 16K MEMORY
3. I/O TERMINAL

2.3.2 OPTIONAL EQUIPMENT

1. RMI REGISTER(G5179) HARDWARE FOR HI ORDER ADDRESS LINE TESTING
2. PDP11 CPU UNIBUS EXERCISER

2.3.3 DIAGNOSTIC PREREQUISITES

IT IS ASSUMED THAT ALL THE ABOVE HARDWARE IS OPERATIONAL AND THAT THERE RESPECTIVE DIAGNOSTICS HAVE BEEN RUN FOR VERIFICATION.

2.3.4 RELATED DOCUMENTS

1. 11/44 CACHE DESIGN SPECIFICATION
2. M7097 CACHE LOGIC SCHEMATIC
3. RMI(G5179) REGISTER DESCRIPTION
   DATED 29 JAN 1979-PDP11 SYS. PROD. SUPPORT
4. PMK05 UNIBUS EXERCISER OPERATING AND SERVICE MANUAL
5. CFKKAA 11/34 DIAGNOSTIC

3.0 OPERATING INSTRUCTIONS

3.1 LOAD AND START PROCEDURE

1. LOAD PROGRAM INTO MEMORY
2. LOAD STARTING ADDRESS 200
3. START

LOADING AND STARTING AT 200 IS NORMAL LOGIC TESTING. THE FIRST PASS IS A QUICK VERIFY PASS FOLLOWED BY AN ENDPASS PRINTOUT. SUBSEQUENT EXECUTION OF THE PROGRAM WILL RESULT IN REPEATED PASSES SPECIFIED BY LOCATION $TIMES BEFORE ENDPASS IS PRINTED AGAIN.
ALL ERRORS ARE ACCOMPANIED BY AN ERROR PRINTOUT CONSISTING OF A MINIMUM OF THE FAILING TEST (TESTNO) AND THE LOCATION IN THE PROGRAM WHERE THE ERROR OCCURED (ERRPC). IT IS NECESSARY FOR THE USER TO REFER TO THE ASSEMBLED LISTING AT THE LOCATION SPECIFIED BY ERRPC FOR AN EXPLANATION OF THE ERROR.

3.2 SWITCH REGISTER OPTIONS

3.2.1 [OPTIONS]

SWITCH	OCTAL	FUNCTION
SW15=1	100000	HALT ON ERROR
SW14=1	040000	LOOP ON TEST SPECIFIED IN SW07:SW00
SW13=1	020000	INHIBIT ERROR TYPEOUTS
SW11=1	004000	INHIBIT ITERATIONS
SW09=1	001000	LOOP ON ERROR
SW08=1	000400	DIAGNOSTIC WILL TEST TO VERIFY THAT INVALIDATION WILL OCCUR DUE TO A READ HIT BYPASS CONDITION: DIAGNOSTIC ASSUMES PHYSICAL STRAP W2 IS IN. IF SW08=0 THEN DIAGNOSTIC TESTS TO VERIFY THAT NO INVALIDATION WILL OCCUR DUE TO A READ HIT BYPASS CONDITION. DIAGNOSTIC,IN THIS CASE, ASSUMES PHYSICAL STRAP W1 IS IN PLACE.
SW07 TO SW00	001-377	SPECIFIES TEST WHEN LOOP ON TEST IS SELECTED(SW14)

3.2.2 LOOP ON ERROR

THE INTENT OF THE LOOP ON ERROR FEATURE (SW09) IS TO GET
A TIGHT CODING LOOP TO OCCUR WHEN AN ERROR HAPPENS TO AID
IN ISOLATING THE FAILURE.
THE FOLLOWING IS A DESCRIPTION OF HOW THE PROGRAM
HANDLES LOOP ON ERROR. FOR THIS EXAMPLE ASSUME THAT THE TEST
HAS BEEN RELOCATED TO HI CACHE BUFFER AREA STARTING AT ADDRESS
70000.

1. AN ERROR OCCURS SO $ERROR ROUTINE IS ENTERED
2. THE APPROPRIATE ERROR MESSAGE IS PRINTED
3. AN APPROPRIATE 'JMP 1$' INSTRUCION IS AUTOMATICALLY WRITTEN BY THE PROGRAM TO THE LOCATION IN HI CACHE BUFFER AREA LOCATION SPECIFIED BY 25$ FOR THIS TEST.
4. THE $ERROR ROUTINE WILL THEN JUMP TO THE LOCATION IN HI CACHE BUFFER AREA SPECIFIED BY 1$ FOR THIS TEST.
5. THE PROGRAM WILL NOW BE EXECUTING A CODE LOOP IN HI CACHE BUFFER AREA BOUNDED BY THE LOCATIONS SPECIFIED BY 1$ AND 25$.

TO CLEAR THIS CONDITION THE CPU MUST BE HALTED FOLLOWED BY
LOADING ADDRESS 200 AND START.IF SW09 BIT IS CLEARED THEN
NORMAL PROGRAM EXECUTION WILL HAVE BEEN RESUMED.

3.2.3 LOOP ON TEST

WHEN LOOP ON TEST IS SELECTED (SW14) THE TEST SPECIFIED
BY BITS 7:0 IN THE SWITCH REGISTER IS EXECUTED
REPEATEDLY.
THE TEST IS LOOPED IN ITS ENTIRETY ,UNLIKE THE LOOP ON ERROR
FEATURE.

3.2.4 IMPLEMENTATION

SELECT SWITCH REGISTER OPTIONS BY USING 11/44 MFM
CONSOLE. TYPE ^P TO ENTER CONSOLE.
NORMAL OPERATION IS TO RUN WITH ALL SWITCH REGISTER
BITS EQUAL TO 0.

3.3 APT

3.3.1 THE FOLLOWING APT USER SWITCH REGISTER BITS ARE DEFINED FOR THIS DIAGNOSTIC AND ARE VALID ONLY IF $ENVM BIT 7=1:

BIT 12 $USWR (UNIBUS EXERCISER)

=1 APT SAYS PDP11 UNIBUS EXERCISER IS PRESENT SO PERFORM DMA TESTS.

=0 APT SAYS DO NOT PERFORM DMA TESTS.

BIT 7 $USWR (RMI REGISTER (G5179))

=1 APT SAYS RMI REGISTER IS PRESENT PERFORM HI ORDER ADDRESS LINE TESTS

=0 APT SAYS DO NOT PERFORM HI ORDER ADDR. LINE TESTS.

3.3.2 THE FOLLOWING IS A PROGRAM LOAD FILE USED BY APT. E TABLE 'A' IS USED FOR APT DUMP MODE AND E TABLE 'B' IS USED FOR APT QV AND RUN TIME MODE.
E TABLE 'B' IS SET UP TO RUN RMI REGISTER TESTS AND UNIBUS EXERCISER TESTS,INHIBIT ITERATIONS, AND SUPPRESS ERROR TYPEOUTS.

1ST PASS RUN TIME	LONGEST TEST TIME	ADDITIONAL RUN TIME
10	5	0

.....	E TABLES	.....
	A	B
E-MODE/S-MODE	200/000	240/001
SWITCH REGISTER 1	004000	004000
SWITCH REGISTER 2	010200	010200
CPU TYPE/OPTIONS	00/0000	00/0000
MEMORY MAP CODE 1	000/00000000	000/00000000
MEMORY MAP CODE 2	000/00000000	000/00000000
MEMORY MAP CODE 3	000/00000000	000/00000000
MEMORY MAP CODE 4	000/00000000	000/00000000
BUS PRIORITY/INTERRUPT 1	0000	0000
BUS PRIORITY/INTERRUPT 2	0000	0000
BUS ADDRESS CODE	000000	000000
DEVICE MAP CODE	000000	000000
CTLR. SPECIFIC WORD 1	000000	000000
CTLR. SPECIFIC WORD 2	000000	000000

345
346
347
348
349
350

3.4 EXECUTION TIMES

1ST PASS:	LESS THAN 10 SEC.
PASSES WITH ITERATIONS:	LESS THAN 75 SEC.

4.0 ERROR INFO

4.1 IN ADDITION TO TESTNO AND ERRPC BEING PRINTED WHEN AN ERROR OCCURS, ADDITIONAL INFORMATION CAN BE GIVEN DEPENDING ON THE TEST. THE INFO. IS IN THE FORM OF DATA DESCRIBED IN A FASHION WHICH RELATES TO THE LOGIC BEING TESTED AND CAN AID IN ISOLATING THE FAILURE.
FOR EXAMPLE, A TEST MAY VERIFY THAT THE CACHE TAG STORE RAMS CAN BE LOADED FROM THE CACHE ADDRESS LINES (CA<21:13>) AND THEN BE READ FROM THE CACHE HIT REGISTER BITS 15:7 (CHR<15:7>). AN ERROR PRINTOUT ,THEREFORE,WOULD LOOK LIKE THE FOLLOWING:

TESTNO	ERRPC	CHR157	CA2113
102	13234	001	000

WHERE: CHR157 SPECIFIES DATA READ FROM CACHE HIT REGISTER BITS 15:7

AND CA3113 SPECIFIES THE ADDRESS PATTERN ON THE CACHE ADDRESS LINES 21:13 USED TO LOAD THE TAG STORE

CA2113 IS ANALAGOUS TO 'DATA EXPECTED' AND CHR157 IS ANALAGOUS TO 'DATA RECEIVED'.

4.2 UNCONTROLLED ERRORS

IF AT ANY TIME THE PROGRAM STOPS WITHOUT PROPER ERROR INDICATION EXAMINING LOCATION SPECIFIED BY $TESTN WILL INDICATE WHAT TEST THE PROGRAM HAD REACHED.

4.3 POWER MONITOR BIT ERRORS

IF THE POWER MONITOR BIT IS FOUND SET IN THE SCOPE ROUTINE, AN ERROR WILL CALL FROM THE SCOPE ROUTINE. LOOP-ON-ERROR IS DISABLED FOR THIS ERROR ONLY. IF THE POWER MONITOR BIT BECOMES SET AFTER THE SCOPE AND FOR ANY REASON A FAILURE OCCURS IN THAT TEST, THE ERROR CALL WILL CALL *TWO* ERRORS, THE FIRST ERROR BEING THE POWER MONITOR BIT ERROR, THEN THE ERROR ORIGINALLY TO BE CALLED.

5.0 HANDLERS AND COMMON ROUTINES

RELCTL: THIS ROUTINE,WHEN CALLED, WILL RELOCATE ALL TEST CODE
OF THE TEST UP TO AND INCLUDING THE LOCATION SPECIFIED
BY 10$: TO LOW CACHE BUFFER AREA BEGINNING AT LOCATION
60000. WHEN THIS HAS BEEN DONE THE ROUTINE WILL JUMP
TO LOCATION 60000 FOR TEST EXECUTION.

RELCTH: THIS ROUTINE,WHEN CALLED, WILL RELOCATE ALL TEST CODE
OF THE TEST UP TO AND INCLUDING THE LOCATION SPECIFIED
BY 10$: TO HIGH CACHE BUFFER AREA BEGINNING AT LOCATION
70000. WHEN THIS HAS BEEN DONE THE ROUTINE WILL JUMP
TO LOCATION 70000 FOR TEST EXECUTION.

$SCPSET: THIS ROUTINE IS PERFORMED AT THE BEGINNING OF EACH
TEST. IT SETS UP VECTORS TO ACCOMPLISH LOOP ON TEST
AND LOOP ON ERROR. THE LOCATIONS SPECIFIED BY 40$,
1$, AND 25$ ARE PASSED TO THE ROUTINE AND ARE
ADDRESS LOCATIONS WHICH ARE INDICATIVE OF WHERE THOSE
LOCATIONS WILL BE WHEN THE TEST IS RELOCATED TO EITHER
HI OR LO CACHE BUFFER AREA.

$ERROR: THIS ROUTINE IS CALLED WHEN THERE IS AN ERROR.
IT WILL ALWAYS TYPE FAILING TEST NUMBER AND FAILING
ERROR PC. IT MAY TYPE ADDITIONAL DATA INFO. DEPENDING
ON THE TEST (USES THE ARGUEMENTS PASSED BY
THE TEST TO THE ROUTINE).%

```
                                .TITLE  CKKKAC0 11-44 KK11B CACHE
                                ;*COPYRIGHT (C) APR 1981
                                ;*DIGITAL EQUIPMENT CORP.
                                ;*MAYNARD, MASS. 01754
                                ;*
                                ;*PROGRAM BY DAN P. MILLEVILLE
                                ;*
                                ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                                ;*PACKAGE (MAINDEC-11-DZQAC-C5), JAN, 1981.
                                ;*
                        000001  $TN=1
                        160000  $SWR=160000     ;;HALT ON ERROR, LOOP ON TEST, INHIBIT ERROR TYPOUT
                                .SBTTL  TRAP CATCHER
                        000000          .=0
                                ;*ALL UNUSED LOCATIONS FROM 4 - 776 CONTAIN A ''.+2,HALT''
                                ;*SEQUENCE TO CATCH ILLEGAL TRAPS AND INTERRUPTS
                                ;*LOCATION 0 CONTAINS 0 TO CATCH IMPROPERLY LOADED VECTORS
                        000174          .=174
000174  000000                  DISPREG:  .WORD  0                ;;SOFTWARE DISPLAY REGISTER
000176  000000                  SWREG:    .WORD  0                ;;SOFTWARE SWITCH REGISTER
                                .SBTTL  STARTING ADDRESS(ES)
000200  000137  000200                  JMP     @#200   ;;JUMP TO STARTING ADDRESS OF PROGRAM
                        000020          .=20
000020  002144                          .WORD   $SCPSET
000022  000340                          .WORD   340
                        000030          .=30
000030  046224                          .WORD   $ERROR
000032  000340                          .WORD   340
000034  046116                          .WORD   $TRAP
000036  000340                          .WORD   340
                        000042          .=42
000042  000000                          .WORD   0
                        000046          .=46
000046  044222                          .WORD   $ENDAD
                        000052          .=52
000052  000000                          .WORD   0
                        000004  SCOPE=4
```

STARTING ADDRESS(ES)

```
                    000200                                  .=200
000200  000137  001000                                      JMP     START
                    001000                                  .=1000
001000  000005                          START:             RESET                   ;DISABLE ALL INTERRUPTS
001002  012706  000500                                      MOV     #500,SP         ;SET STACK POINTER
001006  012737  001032  000004                              MOV     #4$,4           ;SETUP FOR POSSIBLE NEX MEMORY TRAP
001014  012737  000340  000006                              MOV     #340,6
001022  012737  001015  177746                              MOV     #OFF,CCR        ;DISABLE CACHE
001030  000536                                              BR      5$              ;NO TRAP;CONTINUE
001032  022626                                  4$:         CMP     (SP)+,(SP)+     ;ADJUST STACK DUE TO TRAP
001034  012737  000006  000004                              MOV     #6,4            ;RESTORE TRAP VECTORS
001042  005037  000006                                      CLR     6

001046  104401  001054                                      TYPE    ,65$            ;;TYPE ASCIZ STRING
001052  000416                                              BR      64$             ;;GET OVER THE ASCIZ
                                            ;;65$:          .ASCIZ  <CRLF>/CKKKAC0 11-44 KK11B CACHE/
001110                                      64$:
001110  104401  001116                                      TYPE    ,67$            ;;TYPE ASCIZ STRING
001114  000423                                              BR      66$             ;;GET OVER THE ASCIZ
                                            ;;67$:          .ASCIZ  <CRLF>/TRAP THRU NEX MEMORY VECTOR OCCURED/
001164                                      66$:
001164  104401  001172                                      TYPE    ,69$            ;;TYPE ASCIZ STRING
001170  000424                                              BR      68$             ;;GET OVER THE ASCIZ
                                            ;;69$:          .ASCIZ  <CRLF>/DIAGNOSTIC ATTEMPTED TO TURN CACHE OFF/
001242                                      68$:
001242  104401  001250                                      TYPE    ,71$            ;;TYPE ASCIZ STRING
001246  000423                                              BR      70$             ;;GET OVER THE ASCIZ
                                            ;;71$:          .ASCIZ  <CRLF>/BY ADDRESSING CACHE CONTROL REGISTER/
001316                                      70$:
001316  012737  000001  001466                              MOV     #1,$MSGTY       ;SET $MSGTY FOR POSSIBLE APT USE
001324  000000                                              HALT                    ;HALT PROGRAM

001326  012737  000006  000004  5$:         MOV     #6,4            ;RESTORE VECTORS
001334  005037  000006                      CLR     6
001340  005037  001474                      CLR     $PASS           ;CLEAR PASS COUNT
001344  132737  000200  001507              BITB    #APTSIZE,$ENVM  ;IS APT SIZING?
001352  001403                              BEQ     1$              ;NO
001354  012737  001510  002074              MOV     #$SWREG,SWR     ;YES;USE APT SWITCH REGISTER
001362  005737  000042          1$:         TST     42              ;IS THIS MANUAL MODE?
001366  001404                              BEQ     3$              ;YES TYPE ID
001370  023737  000042  000046              CMP     42,46           ;IS THIS ACT 11 QV OR AUTO MODE?
001376  001423                              BEQ     2$              ;YES;SKIP TITLE
001400  000240                  3$:         NOP
001402  000240                              NOP
001404  104401  001412                      TYPE    ,73$            ;;TYPE ASCIZ STRING
001410  000416                              BR      72$             ;;GET OVER THE ASCIZ
                                ;;73$:      .ASCIZ  <CRLF>/CKKKAC0 11-44 KK11B CACHE /
001446                          72$:

001446  000137  002500          2$:         JMP     BEGIN           ;START TEST
```

```
575                                     .SBTTL  APT PARAMETER BLOCK
                                        ;;*****************************************************************
                                        ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                        ;;*****************************************************************
001452                                          .$X=.   ;;SAVE CURRENT LOCATION
000024                                          .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
000024  000200                                 200     ;;FOR APT START UP
000044                                          .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
000044  001452                                 $APTHDR ;;POINT TO APT HEADER BLOCK
001452                                          .=.$X   ;;RESET LOCATION COUNTER
                                        ;;*****************************************************************
                                        ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                        ;INTERFACE SPEC.
001452                                  $APTHD:
001452  000000                          $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
001454  001466                          $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
001456  000005                          $TSTM:  .WORD   5       ;;RUN TIM OF LONGEST TEST
001460  000010                          $PASTM: .WORD   10      ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
001462  000000                          $UNITM: .WORD   0       ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
001464  000052                                  .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
```

```
577                                     .SBTTL  APT MAILBOX-ETABLE
                                        ;;*****************************************************************
                                        .EVEN
001466                                  $MAIL:                          ;;APT MAILBOX
001466  000000                         $MSGTY: .WORD   AMSGTY          ;;MESSAGE TYPE CODE
001470  000000                         $FATAL: .WORD   AFATAL          ;;FATAL ERROR NUMBER
001472  000000                         $TESTN: .WORD   ATESTN          ;;TEST NUMBER
001474  000000                         $PASS:  .WORD   APASS           ;;PASS COUNT
001476  000000                         $DEVCT: .WORD   ADEVCT          ;;DEVICE COUNT
001500  000000                         $UNIT:  .WORD   AUNIT           ;;I/O UNIT NUMBER
001502  000000                         $MSGAD: .WORD   AMSGAD          ;;MESSAGE ADDRESS
001504  000000                         $MSGLG: .WORD   AMSGLG          ;;MESSAGE LENGTH
001506                                  $ETABLE:                        ;;APT ENVIRONMENT TABLE
001506     000                         $ENV:   .BYTE   AENV            ;;ENVIRONMENT BYTE
001507     000                         $ENVM:  .BYTE   AENVM           ;;ENVIRONMENT MODE BITS
001510  000000                         $SWREG: .WORD   ASWREG          ;;APT SWITCH REGISTER
001512  000000                         $USWR:  .WORD   AUSWR           ;;USER SWITCHES
001514  000000                         $CPUOP: .WORD   ACPUOP          ;;CPU TYPE,OPTIONS
                                        ;*                              BITS 15-11=CPU TYPE
                                        ;*                                      11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
                                        ;*                                      11/70=06,PDQ=07,Q=10
                                        ;*                              BIT 10=REAL TIME CLOCK
                                        ;*                              BIT  9=FLOATING POINT PROCESSOR
                                        ;*                              BIT  8=MEMORY MANAGEMENT
001516     000                         $MAMS1: .BYTE   AMAMS1          ;;HIGH ADDRESS,M.S. BYTE
001517     000                         $MTYP1: .BYTE   AMTYP1          ;;MEM. TYPE,BLK#1
                                        ;*                              MEM.TYPE BYTE   --  (HIGH BYTE)
                                        ;*                                      900 NSEC CORE=001
                                        ;*                                      300 NSEC BIPOLAR=002
                                        ;*                                      500 NSEC MOS=003
001520  000000                         $MADR1: .WORD   AMADR1          ;;HIGH ADDRESS,BLK#1
                                        ;*                                MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF ''TYPE'' ABOVE
001522     000                         $MAMS2: .BYTE   AMAMS2          ;;HIGH ADDRESS,M.S. BYTE
001523     000                         $MTYP2: .BYTE   AMTYP2          ;;MEM.TYPE,BLK#2
001524  000000                         $MADR2: .WORD   AMADR2          ;;MEM.LAST ADDRESS,BLK#2
001526     000                         $MAMS3: .BYTE   AMAMS3          ;;HIGH ADDRESS,M.S.BYTE
001527     000                         $MTYP3: .BYTE   AMTYP3          ;;MEM.TYPE,BLK#3
001530  000000                         $MADR3: .WORD   AMADR3          ;;MEM.LAST ADDRESS,BLK#3
001532     000                         $MAMS4: .BYTE   AMAMS4          ;;HIGH ADDRESS,M.S.BYTE
001533     000                         $MTYP4: .BYTE   AMTYP4          ;;MEM.TYPE,BLK#4
001534  000000                         $MADR4: .WORD   AMADR4          ;;MEM.LAST ADDRESS,BLK#4
001536  000000                         $VECT1: .WORD   AVECT1          ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
001540  000000                         $VECT2: .WORD   AVECT2          ;;INTERRUPT VECTOR#2BUS PRIORITY#2
001542  000000                         $BASE:  .WORD   ABASE           ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
001544  000000                         $DEVM:  .WORD   ADEVM           ;;DEVICE MAP
001546  000000                         $CDW1:  .WORD   ACDW1           ;;CONTROLLER DESCRIPTION WORD#1
001550  000000                         $CDW2:  .WORD   ACDW2           ;;CONTROLLER DESCRIPTION WORD#2
001552  000000                         $DDW0:  .WORD   ADDW0           ;;DEVICE DESCRIPTOR WORD#0
001554  000000                         $DDW1:  .WORD   ADDW1           ;;DEVICE DESCRIPTOR WORD#1
001556  000000                         $DDW2:  .WORD   ADDW2           ;;DEVICE DESCRIPTOR WORD#2
001560  000000                         $DDW3:  .WORD   ADDW3           ;;DEVICE DESCRIPTOR WORD#3
001562  000000                         $DDW4:  .WORD   ADDW4           ;;DEVICE DESCRIPTOR WORD#4
001564  000000                         $DDW5:  .WORD   ADDW5           ;;DEVICE DESCRIPTOR WORD#5
001566  000000                         $DDW6:  .WORD   ADDW6           ;;DEVICE DESCRIPTOR WORD#6
001570  000000                         $DDW7:  .WORD   ADDW7           ;;DEVICE DESCRIPTOR WORD#7
001572  000000                         $DDW8:  .WORD   ADDW8           ;;DEVICE DESCRIPTOR WORD#8
001574  000000                         $DDW9:  .WORD   ADDW9           ;;DEVICE DESCRIPTOR WORD#9
```

```
                                                    D 2
001576  000000          $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
001600  000000          $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
001602  000000          $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
001604  000000          $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
001606  000000          $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
001610  000000          $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15
001612                  $ETEND:
```

```
579                                     .SBTTL  APT COMMUNICATIONS ROUTINE
                                        ;;*****************************************************************
001612  112737  000001  002056  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
001620  112737  000001  002054  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
001626  000403                         BR      $ATYC
001630  112737  000001  002056  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
001636                          $ATYC:
001636  010046                         MOV     R0,-(SP)        ;;PUSH R0 ON STACK
001640  010146                         MOV     R1,-(SP)        ;;PUSH R1 ON STACK
001642  105737  002054                 TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
001646  001450                         BEQ     5$              ;;IF NOT:  BR
001650  122737  000001  001506         CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
001656  001031                         BNE     3$              ;;IF NOT:  BR
001660  132737  000100  001507         BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
001666  001425                         BEQ     3$              ;;IF NOT:  BR
001670  017600  000004                 MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
001674  062766  000002  000004         ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
001702  005737  001466          1$:    TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
001706  001375                         BNE     1$              ;;IF NOT:  WAIT
001710  010037  001502                 MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
001714  105720                  2$:    TSTB    (R0)+           ;;FIND END OF MESSAGE
001716  001376                         BNE     2$
001720  163700  001502                 SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
001724  006200                         ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
001726  010037  001504                 MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
001732  012737  000004  001466         MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
001740  000413                         BR      5$
001742  017637  000004  001766  3$:    MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
001750  062766  000002  000004         ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
001756  013746  177776                 MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
001762  004737  044242                 JSR     PC,$TYPE        ;;CALL TYPE MACRO
001766  000000                  4$:    .WORD   0
001770                          5$:
001770  105737  002056          10$:   TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
001774  001416                         BEQ     12$             ;;IF NOT:  BR
001776  005737  001506                 TST     $ENV            ;;RUNNING UNDER APT?
002002  001413                         BEQ     12$             ;;IF NOT:  BR
002004  005737  001466          11$:   TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
002010  001375                         BNE     11$             ;;IF NOT:  WAIT
002012  017637  000004  001470         MOV     @4(SP),$FATAL   ;;GET ERROR #
002020  062766  000002  000004         ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
002026  005237  001466                 INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
002032  105037  002056          12$:   CLRB    $FFLG           ;;CLEAR FATAL FLAG
002036  105037  002055                 CLRB    $LFLG           ;;CLEAR LOG FLAG
002042  105037  002054                 CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
002046  012601                         MOV     (SP)+,R1        ;;POP STACK INTO R1
002050  012600                         MOV     (SP)+,R0        ;;POP STACK INTO R0
002052  000207                         RTS     PC              ;;RETURN
002054     000                  $MFLG:  .BYTE   0               ;;MESSG. FLAG
002055     000                  $LFLG:  .BYTE   0               ;;LOG FLAG
002056     000                  $FFLG:  .BYTE   0               ;;FATAL FLAG
                                        .EVEN
                                APTSIZE=200
                                APTENV=001
                                APTSPOOL=100
                                APTCSUP=040
```

```
                                        ;;*****************************************************************
                                        ;       USER LABELS
                                        ;;*****************************************************************

002060  000000                  $TSTNM: .WORD   0
002062  000000                  LOOP:   .WORD   0
002064  000000                  CMRPAT: .WORD   0
002066  000000                  CHRPAT: .WORD   0
002070  000000                  FAIL1:  .WORD   0
002072  000000                  FAIL2:  .WORD   0

002074  177570                  SWR:    .WORD   177570
002076  177560                  $TKS:   177560
002100  177562                  $TKB:   177562
002102  177564                  $TPS:   177564
002104  177566                  $TPB:   177566
002106     000                  $NULL:  .BYTE   0
002107     002                  $FILLS: .BYTE   2
002110     012                  $FILLC: .BYTE   12
002111     000                  $TPFLG: .BYTE   0
002112     207     377     377  $BELL:  .ASCIZ  <207><377><377>
002116     077                  $QUES:  .ASCII  /?/
002117     015                  $CRLF:  .ASCII  <15>
002120     012     000          $LF:    .ASCIZ  <12>
002122     377     377     000  $ENULL: .BYTE   -1,-1,0
                                        .EVEN
                                        .SBTTL   REGISTER DEFINITIONS


177744                          CME = 177744            ;CACHE MEMORY PARITY FAULT REGISTER
177746                          CCR = 177746            ;CACHE CONTROL REGISTER
177750                          CMR = 177750            ;CACHE MAINTENANCE REGISTER
177752                          CHR = 177752            ;CACHE HIT REGISTER
177754                          CDR = 177754            ;CACHE DATA REGISTER
177776                          PSW = 177776            ;PROCESSER STATUS WORD
000000                          R0 = %0                 ;GENERAL REGISTERS
000001                          R1 = %1
000002                          R2 = %2
000003                          R3 = %3
000004                          R4 = %4
000005                          R5 = %5
000006                          SP = %6
000007                          PC = %7
000001                          BIT00 = 1
000002                          BIT01 = 2
000004                          BIT02 = 4
000010                          BIT03 = 10
000020                          BIT04 = 20
000040                          BIT05 = 40
000100                          BIT06 = 100
000200                          BIT07 = 200
000400                          BIT08 = 400
001000                          BIT09 = 1000
002000                          BIT10 = 2000
004000                          BIT11 = 4000
010000                          BIT12 = 10000
```

```
                000020          BIT13 = 20000
                000040          BIT14 = 40000
                000100          BIT15 = 100000

                172300          KPDR0 = 172300
                172302          KPDR1 = 172302
                172304          KPDR2 = 172304
                172306          KPDR3 = 172306
                172310          KPDR4 = 172310
                172312          KPDR5 = 172312
                172314          KPDR6 = 172314
                172316          KPDR7 = 172316
                172340          KPAR0 = 172340
                172342          KPAR1 = 172342
                172344          KPAR2 = 172344
                172346          KPAR3 = 172346
                172350          KPAR4 = 172350
                172352          KPAR5 = 172352
                172354          KPAR6 = 172354
                172356          KPAR7 = 172356
                177572          SR0   = 177572
                172516          SR3   = 172516
                170200          UMPR00= 170200
                170202          UMPR01= 170202
                170204          UMPR02= 170204
                170206          UMPR03= 170206
                170210          UMPR04= 170210
                170212          UMPR05= 170212
                170214          UMPR06= 170214
                170216          UMPR07= 170216
                170220          UMPR08= 170220
                170222          UMPR09= 170222
                170002          BECC  = 170002
                170004          BEBA  = 170004
                170000          BEDA  = 170000
                170006          BECR1 = 170006
                170016          BECR2 = 170016

                000200          APTSIZE=200
                000001          APTENV=001
                000100          APTSPOOL=100
                000040          APTCSUP=040

                              ;CCR REGISTER
                000001          DCPI=1
                000004          FMLO=4
                000010          FMHI=10
                000100          WWPD=100
                000200          PEA=200
                000400          FC=400
                001000          UCB=1000
                002000          WWPT=2000
                010000          VCIP=10000
                020000          VSIU=20000

                              ;CMR REGISTER
```

```
695          000001                          TDAR=1
696          000002                          HODO=2
697          000004                          EHA=4
698          000010                          AM=10
699          000020                          ESA=20
700          000400                          HIT=400
701          001000                          TPB=1000
702          002000                          LPB=2000
703          004000                          HPB=4000
704          010000                          VLD=10000
705          020000                          CM3=20000
706          040000                          CM2=40000
707          100000                          CM1=100000
708
709                                      ;CME REGISTER
710          000040                          TPE=40
711          000100                          PELO=100
712          000200                          PEHI=200
713          100000                          CMPE=100000
714
715          000001                          TSTID=1
716          000004                          SCPCND=4
717          001015                          OFF=1015
```

```
                                ;;*****************************************************************
                                ;       SETUP TEST CONDITIONS:
                                ;                               1. TEST ITERATIONS
                                ;                               2. LOAD TEST VECTORS FOR LOOP ON TEST,
                                ;                                  LOOP ON ERROR
                                ;
                                ;;*****************************************************************
002126  000000                  STRTST: .WORD   0
002130  000000                  STRTLP: .WORD   0
002132  000000                  ADRSYNC: .WORD  0
002134  000000                  ADRJMP: .WORD   0
002136  000000                  ADR1$:  .WORD   0
002140  000000                  TSTCNT: .WORD   0
002142  000001                  TSTIMS: .WORD   1.


002144  013737  177766  046220  $SCPSET:MOV     177766,CPSAVE   ;MOVE CPU ERR REG VALUE TO LOC FOR TST  ;DPM001
002152  032737  000001  046220          BIT     #BIT00,CPSAVE   ;SEE IF THE POWER MONITOR BIT IS ON     ;DPM001
002160  001417                          BEQ     2000$           ;BRANCH TO CONTINUE ROUTINE IF CLEAR    ;DPM001
002162  042737  000001  177766          BIC     #BIT00,177766   ;CLEAR THE BIT FOUND TO BE SET          ;DPM001
002170  012737  000177  001470          MOV     #177,$FATAL     ;LET APT KNOW THIS IS A PWR MNTR BIT ERR;DPM001
002176  012737  002204  002422          MOV     #905$,$ERRPC    ;MOVE ERROR PC TO $ERRPC                ;DPM001
002204  104413                  905$:   ERROR                   ;CALL SPECIAL POWER FAIL BIT ERROR CALL ;DPM001
002206  002204                          .WORD   .-2             ;LOCATION CONTAINING ERROR PC           ;DPM001
002210  046220  000000                  .WORD   CPSAVE,0        ;LOCATION OF DATA TO PRINT              ;DPM001
002214  005037  001470                  CLR     $FATAL          ;REMOVE 177 FROM $FATAL                 ;DPM001
002220  012737  000340  177776  2000$:   MOV     #340,PSW        ;CPU HI PRIORITY
002226  113737  001472  002060          MOVB    $TESTN,$TSTNM   ;MOVE TEST NUMBER TO $TSTNM
002234  022737  000001  001472          CMP     #1,$TESTN       ;IS THIS TEST 1?
002242  001436                          BEQ     3$              ;YES,DO NOT CONSIDER LOOP ON TEST
002244  005037  177744                  CLR     CME             ;CLEAR THE CACHE MEMORY PARITY FAULT REGISTER
002250  032777  040000  177616          BIT     #BIT14,@SWR     ;LOOP ON TEST?
002256  001413                          BEQ     4$              ;NO
002260  013702  001472                  MOV     $TESTN,R2       ;GET PRESENT TEST NUMBER
002264  005302                          DEC     R2              ;GET LAST TEST NUMBER
002266  120277  177602                  CMPB    R2,@SWR         ;IS THIS THE TEST?
002272  001005                          BNE     4$              ;NO
002274  005337  001472          5$:     DEC     $TESTN          ;YES;PREPARE FOR LOOP ON TEST
002300  013716  002126                  MOV     STRTST,(SP)     ;FUDGE RETURN
002304  000002                          RTI                     ;GO LOOP ON TEST
002306  005737  001474          4$:     TST     $PASS           ;FIRST PASS?
002312  001412                          BEQ     3$              ;YES;INHIBIT TEST ITERATIONS
002314  032777  004000  177552          BIT     #BIT11,@SWR     ;INHIBIT ITERATIONS?
002322  001006                          BNE     3$              ;YES
002324  005237  002140                  INC     TSTCNT          ;INCREMENT TEST ITERATION COUNTER
002330  023737  002142  002140          CMP     TSTIMS,TSTCNT   ;ITERATIONS COMPLETE?
002336  001356                          BNE     5$              ;NO CONTINUE WITH TEST
002340  005037  002140          3$:     CLR     TSTCNT
002344  011601                          MOV     (SP),R1         ;GET ADDRESS OF FIRST ARGUEMENT
002346  012137  002126                  MOV     (R1)+,STRTST    ;LOCATION OF START OF TEST
002352  012137  002130                  MOV     (R1)+,STRTLP    ;LOCATION OF START OF SCOPE LOOP
002356  012137  002132                  MOV     (R1)+,ADRSYNC   ;ADDRESS LOADED INTO AMR FOR SCOPE SYNC
002362  012137  002134                  MOV     (R1)+,ADRJMP    ;ADDRESS OF END OF SCOPE LOOP AND
                                                                ;WHERE 'JMP' IS WRITTEN
002366  013737  002134  002136          MOV     ADRJMP,ADR1$    ;
002374  062737  000002  002136          ADD     #2,ADR1$        ;LOCATION WHERE '1$' IS WRITTEN
```

```
 775 002402  012777  000240  177524          MOV     #240,@ADRJMP    ;INITIALIZE SCOPE LOCATIONS
 776 002410  012777  000240  177520          MOV     #240,@ADR1$
 777 002416  010116                          MOV     R1,(SP)         ;SETUP STACK FOR RETURN
 778 002420  000002                          RTI
 779 002422  000000                $ERRPC:   .WORD   0               ;LOCATION TO SAVE ERROR PC
```

```
                                .SBTTL  RELOCATION HANDLERS
                        ;;**************************************************************
                        ;               RELOCATION HANDLERS
                        ;;**************************************************************


002424  012701  060000  RELCTL: MOV     #LOW1,R1        ;START OF LOW SPACE
002430  012402                 MOV     (R4)+,R2        ;END OF MOVE
002432  012421          1$:    MOV     (R4)+,(R1)+     ;TRANSFER TEST
002434  020402                 CMP     R4,R2           ;PROCEED TO STOP MARK
002436  001375                 BNE     1$
002440  013721  002450         MOV     2$,(R1)+        ;RETURN INSTRUCTION
002444  000137  060000         JMP     60000           ;START TESTS
002450  000204          2$:    RTS     R4
002452  012701  070000  RELCTH: MOV     #HIGH1,R1       ;START OF HI SPACE
002456  012402                 MOV     (R4)+,R2        ;END OF MOVE
002460  012421          1$:    MOV     (R4)+,(R1)+     ;TRANSFER TEST
002462  020402                 CMP     R4,R2           ;PROCEED TO STOP MARK
002464  001375                 BNE     1$
002466  013721  002476         MOV     2$,(R1)+        ;RETURN INSTRUCTION
002472  000137  070000         JMP     70000           ;START TESTS
002476  000204          2$:    RTS     R4
```

```
    802 002500  012706  000500          BEGIN:  MOV     #500,SP         ;SET UP STACK
    803 002504  000005                          RESET
    804 002506  012737  000340  177776          MOV     #340,PSW        ;CPU HI PRIORITY
    805 002514  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
    806 002522  005037  001472                  CLR     $TESTN          ;RESET TEST ID COUNTER
    807 002526  012737  000002  000000          MOV     #2,0            ;INITIALIZE A FEW VECTORS
    808 002534  005037  000002                  CLR     2
    809 002540  012737  000006  000004          MOV     #6,4
    810 002546  005037  000006                  CLR     6
    811 002552  012737  000116  000114          MOV     #116,114
    812 002560  005037  000116                  CLR     116
    813 002564  005037  002062                  CLR     LOOP            ;SOFTWARE DELAY
    814 002570  005337  002062          1$:     DEC     LOOP
    815 002574  001375                          BNE     1$
```

```
                                .SBTTL  TEST # 1 - CACHE REGISTER RESPONSE TESTS
                                ;;*****************************************************************
                                ;*TEST 1         CACHE REGISTER RESPONSE TESTS
                                ;*      ATTEMPT READ INTO CME TO TEST ADDRESS SELECT LOGIC
                                ;*      IF TIME OUT OCCURES THEN LOGIC IN FAULT
                                ;;*****************************************************************
    002576                      TST1:
    002576  000004                     SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
    002600  002610                      .WORD   40$             ;TEST START LOCATION
    002602  002610                      .WORD   1$              ;LOOP ON ERROR START LOCATION
    002604  000000                      .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
    002606  002634                      .WORD   25$             ;LOOP ON ERROR END LOCATION
    002610                      40$:
821 002610  012737  002642  000004 1$:     MOV     #2$,4          ;SETUP TRAP VECTOR
822 002616  012737  000340  000006          MOV     #340,6
823 002624  005737  177744                  TST     CME            ;READ PARITY REGISTER
824 002630  000240                          NOP
825 002632  000240                          NOP
826 002634  000240                  25$:    NOP                    ;INSTRUCTION 'JMP 1$' PLACED HERE
    002636  000240                          NOP                    ;FOR  LOOP ON ERROR
827 002640  000411                          BR      10$            ;NO FAULT;GO TO NEXT TEST
828 002642  022626                  2$:     CMP     (SP)+,(SP)+    ;READJUST STACK DUE TO INTERRUPT
829 002644  012737  000006  000004          MOV     #6,4           ;RESTORE TRAP VECTOR
830 002652  005037  000006                  CLR     6
831 002656  104413                          ERROR                  ;ERROR
                                                                   ;-----
    002660  002656                      .WORD   .-2
832                                                                ;CACHE REGISTER RESPONSE TESTS
833                                                                ;READING PARITY FAULT REGISTER
834                                                                ;CAUSED TIMEOUT
835
836 002662  000000                      .WORD   0
837 002664  000240          10$:    NOP                            ;END OF TEST
    002666  005237  001472            INC     $TESTN             ;INCREMENT TEST COUNTER
```

```
842                                     .SBTTL  TEST # 2 - READ CCR TO CHECK ADDRESS SELECT LOGIC
                                        ;;*****************************************************************
                                        ;*TEST 2        READ CCR TO CHECK ADDRESS SELECT LOGIC
                                        ;*      ATTEMPT READ INTO CCR TO CHECK ADDRESS SELECT LOGIC
                                        ;*      IF TIME OUT OCCURES THEN LOGIC IN FAULT
                                        ;;*****************************************************************
    002672                              TST2:
    002672  000004                              SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
    002674  002704                              .WORD   40$             ;TEST START LOCATION
    002676  002704                              .WORD   1$              ;LOOP ON ERROR START LOCATION
    002700  000000                              .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
    002702  002730                              .WORD   25$             ;LOOP ON ERROR END LOCATION
    002704                              40$:
843 002704  012737  002736  000004     1$:     MOV     #2$,4           ;SETUP TRAP VECTOR
844 002712  012737  000340  000006             MOV     #340,6
845 002720  005737  177746                     TST     CCR             ;READ CACHE CONTROL REGISTER
846 002724  000240                             NOP
847 002726  000240                             NOP
848 002730  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
    002732  000240                             NOP                     ;FOR  LOOP ON ERROR
849 002734  000411                             BR      10$             ;NO FAULT;GO TO NEXT TEST
850 002736  022626                     2$:     CMP     (SP)+,(SP)+     ;READJUST STACK DUE TO INTERRUPT
851 002740  012737  000006  000004             MOV     #6,4            ;RESTORE TRAP VECTOR
852 002746  005037  000006                     CLR     6
853 002752  104413                             ERROR                   ;ERROR
                                                                        ;-----
    002754  002752                              .WORD   .-2
854                                                                     ;CACHE REGISTER RESPONSE TESTS
855                                                                     ;READING CACHE CONTROL REGISTER
856                                                                     ;CAUSED TIMEOUT
857
858 002756  000000                              .WORD   0
859 002760  000240                     10$:    NOP                     ;END OF TEST
    002762  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 3 - READ CMR TO CHECK ADDRESS SELECT LOGIC

```
                                        .SBTTL  TEST # 3 - READ CMR TO CHECK ADDRESS SELECT LOGIC
                                        ;;*****************************************************************
                                        ;*TEST 3        READ CMR TO CHECK ADDRESS SELECT LOGIC
                                        ;*      ATTEMPT READ INTO CMR TO  CHECK ADDRESS SELECT LOGIC
                                        ;*      IF TIME OCCURES THEN LOGIC IN FAULT
                                        ;;*****************************************************************
002766                                  TST3:
002766  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
002770  003000                                  .WORD   40$             ;TEST START LOCATION
002772  003000                                  .WORD   1$              ;LOOP ON ERROR START LOCATION
002774  000000                                  .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
002776  003024                                  .WORD   25$             ;LOOP ON ERROR END LOCATION
003000                                  40$:
865 003000  012737  003032  000004      1$:     MOV     #2$,4           ;SETUP TRAP VECTOR
866 003006  012737  000340  000006              MOV     #340,6
867 003014  005737  177750                      TST     CMR             ;READ MAINTENANCE REGISTER
868 003020  000240                              NOP
869 003022  000240                              NOP
870 003024  000240                      25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
    003026  000240                              NOP                     ;FOR  LOOP ON ERROR
871 003030  000411                              BR      10$             ;NO FAULT;GO TO NEXT TEST
872 003032  022626                      2$:     CMP     (SP)+,(SP)+     ;READJUST STACK DUE TO INTERRUPT
873 003034  012737  000006  000004              MOV     #6,4            ;RESTORE TRAP VECTOR
874 003042  005037  000006                      CLR     6
875 003046  104413                              ERROR                   ;ERROR
                                                                        ;-----
    003050  003046                              .WORD   .-2
876                                                                     ;CACHE REGISTER RESPONSE TESTS
877                                                                     ;READING MAINTENANCE REGISTER
878                                                                     ;CAUSED TIMEOUT
879 003052  000000                              .WORD   0
880 003054  000240                      10$:    NOP                     ;END OF TEST
    003056  005237  001472                      INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 4 - READ INTO CHR TO CHECK ADDRESS SELECT LOGIC
                                ;;*****************************************************************
                                ;*TEST 4        READ INTO CHR TO CHECK ADDRESS SELECT LOGIC
                                ;*      ATTEMPT READ INTO CHR TO CHECK ADDRESS SELECT LOGIC
                                ;*      IF TIME OUT OCCURES THEN LOGIC IN FAULT
                                ;;*****************************************************************
003062                          TST4:
003062  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
003064  003074                          .WORD   40$             ;TEST START LOCATION
003066  003074                          .WORD   1$              ;LOOP ON ERROR START LOCATION
003070  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
003072  003120                          .WORD   25$             ;LOOP ON ERROR END LOCATION
003074                          40$:
886 003074  012737  003126  000004 1$:    MOV     #2$,4           ;SETUP TRAP VECTOR
887 003102  012737  000340  000006      MOV     #340,6
888 003110  005737  177752              TST     CHR             ;READ HIT REGISTER
889 003114  000240                      NOP
890 003116  000240                      NOP
891 003120  000240              25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
003122  000240                          NOP                     ;FOR  LOOP ON ERROR
892 003124  000411                      BR      10$             ;NO FAULT;GO TO NEXT TEST
893 003126  022626              2$:     CMP     (SP)+,(SP)+     ;READJUST STACK DUE TO INTERRUPT
894 003130  012737  000006  000004      MOV     #6,4            ;RESTORE TRAP VECTOR
895 003136  005037  000006              CLR     6
896 003142  104413                      ERROR                   ;ERROR
                                                                ;-----
003144  003142                          .WORD   .-2
897                                                             ;CACHE REGISTER RESPONSE TESTS
898                                                             ;READING HIT REGISTER
899                                                             ;CAUSED TIMEOUT
900 003146  000000                      .WORD   0
901 003150  000240              10$:    NOP                     ;END OF TEST
003152  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 5 - READ CDR TO CHECK ADDRESS SELECT LOGIC
                                ;;*****************************************************************
                                ;*TEST 5        READ CDR TO CHECK ADDRESS SELECT LOGIC
                                ;*      ATTEMPT READ INTO CDR TO CHECK ADDRESS SELECT LOGIC
                                ;*      IF TIMEOUT OCCURS THEN LOGIC IN FAULT
                                ;;*****************************************************************
    003156                      TST5:
    003156  000004                      SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
    003160  003170                      .WORD   40$             ;TEST START LOCATION
    003162  003170                      .WORD   1$              ;LOOP ON ERROR START LOCATION
    003164  000000                      .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
    003166  003214                      .WORD   25$             ;LOOP ON ERROR END LOCATION
    003170                      40$:
907 003170  012737  003222  000004 1$:     MOV     #2$,4           ;SETUP TRAP VECTOR
908 003176  012737  000340  000006      MOV     #340,6
909 003204  005737  177754              TST     CDR             ;READ DATA REGISTER
910 003210  000240                      NOP
911 003212  000240                      NOP
912 003214  000240              25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
    003216  000240                      NOP                     ;FOR  LOOP ON ERROR
913 003220  000411                      BR      10$             ;NO FAULT;GO TO NEXT TEST
914 003222  022626              2$:     CMP     (SP)+,(SP)+     ;READJUST STACK DUE TO INTERRUPT
915 003224  012737  000006  000004      MOV     #6,4            ;RESTORE TRAP VECTOR
916 003232  005037  000006              CLR     6
917 003236  104413                      ERROR                   ;ERROR
                                                                ;-----
    003240  003236                      .WORD   .-2
918                                                             ;CACHE REGISTER RESPONSE TESTS
919                                                             ;READING DATA REGISTER
920                                                             ;CAUSED TIMEOUT
921 003242  000000                      .WORD   0
922 003244  000240              10$:    NOP                     ;END OF TEST
    003246  005237  001472              INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 6 - TEST ADRS SEL LOGIC - WRITE 1 TO BIT 0 OF CME

```
                                .SBTTL  TEST # 6 - TEST ADRS SEL LOGIC - WRITE 1 TO BIT 0 OF CME
                                ;;*****************************************************************
                                ;*TEST 6         TEST ADRS SEL LOGIC - WRITE 1 TO BIT 0 OF CME
                                ;*      TESTING ADDRESS SELECTION LOGIC BY WRITING ONE INTO UNUSED
                                ;*      CME REGISTER BIT00 THEN READ CONTENTS OF REGISTER BACK
                                ;*      LOOKING TO SEE IF BIT00 STILL READS AS 0.
                                ;*      IF BIT00 IS SET IT IS POSSIBLE WE ARE ADDRESSING THE WRONG
                                ;*      REGISTER
                                ;;*****************************************************************
                                TST6:
003252
003252  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
003254  003264                          .WORD   40$             ;TEST START LOCATION
003256  003264                          .WORD   1$              ;LOOP ON ERROR START LOCATION
003260  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
003262  003272                          .WORD   25$             ;LOOP ON ERROR END LOCATION
003264                          40$:
931 003264  012737  000001  177744  1$:     MOV     #1,CME          ;WRITE 1 INTO BIT00
932 003272  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
003274  000240                          NOP                     ;FOR  LOOP ON ERROR
933 003276  032737  000001  177744          BIT     #1,CME          ;CHECK FOR 0
934 003304  001403                          BEQ     10$             ;PASS;NEXT TEST
935 003306  104413                          ERROR                   ;ERROR
                                                                ;-----
003310  003306                          .WORD   .-2
936                                                             ;CACHE REGISTER RESPONSE TESTS
937                                                             ;UNUSED CME BIT00 READ AS 1
938                                                             ;POSSIBLE REG. ADDRESS ERROR
939 003312  000000                      .WORD   0
940 003314  000240                  10$:    NOP                     ;END OF TEST
003316  005237  001472                      INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 7 - TEST BIT 0 OF DCPI & BIT 1 OF CCR

```
947                                     .SBTTL  TEST # 7 - TEST BIT 0 OF DCPI & BIT 1 OF CCR
                                        ;;*****************************************************************
                                        ;*TEST 7         TEST BIT 0 OF DCPI & BIT 1 OF CCR
                                        ;*      ASSURING BIT00(DCPI) READS AS A 1 AND TESTING ADDRESS
                                        ;*      SELECT LOGIC BY WRITING 1 INTO BIT00 OF CCR AND THEN
                                        ;*      READING A 1.IF BIT00 READS AS 0 POSSIBLE ADDRESSING
                                        ;*      WRONG REGISTER OR CCR REGISTER/DATA PATH  ARE BAD.
                                        ;;*****************************************************************
    003322                              TST7:
    003322  000004                              SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
    003324  003334                              .WORD   40$             ;TEST START LOCATION
    003326  003334                              .WORD   1$              ;LOOP ON ERROR START LOCATION
    003330  000000                              .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
    003332  003342                              .WORD   25$             ;LOOP ON ERROR END LOCATION
    003334                              40$:
948 003334  032737  000001  177746      1$:     BIT     #1,CCR          ;CHECK BIT00 FOR 1
949 003342  000240                      25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
    003344  000240                              NOP                     ;FOR  LOOP ON ERROR
950 003346  001003                              BNE     10$             ;PASS;NXT TEST
951 003350  104413                              ERROR                   ;ERROR
                                                                        ;-----
    003352  003350                              .WORD   .-2
952                                                                     ;CACHE REGISTER RESPONSE TESTS
953                                                                     ;WROTE 1 INTO BIT00 CCR; READ 0
954 003354  000000                              .WORD   0
955 003356  000240                      10$:    NOP                     ;END OF TEST
    003360  005237  001472                      INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 10 - CACHE CONTROL REGISTER DATA TEST (CCR)
                                ;;*****************************************************************
                                ;*TEST 10       CACHE CONTROL REGISTER DATA TEST (CCR)
                                ;*      VERIFY THAT CCR BIT12(VCIP) READS AS A 0, SINCE A CLEARING
                                ;*      OF VALID STORE SHOULD NOT BE HAPPENING AT THIS TIME
                                ;;*****************************************************************
                                TST10:
003364
003364  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
003366  003376                          .WORD   40$             ;TEST START LOCATION
003370  003376                          .WORD   1$              ;LOOP ON ERROR START LOCATION
003372  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
003374  003404                          .WORD   25$             ;LOOP ON ERROR END LOCATION
003376                          40$:
961 003376  032737  010000  177746  1$:     BIT     #BIT12,CCR      ;CHECK FOR 0
962 003404  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
003406  000240                          NOP                     ;FOR  LOOP ON ERROR
963 003410  001403                          BEQ     10$             ;PASS
964 003412  104413                          ERROR                   ;ERROR
                                                                ;-----
003414  003412                          .WORD   .-2
965                                                             ;CCR DATA TEST
966                                                             ;READ 1 FROM CCR BIT12. A CLEARING OF
967                                                             ;VALID STORE AT THIS TIME SHOULD NOT
968                                                             ;BE INDICATED
969 003416  000000                          .WORD   0
970 003420  000240                  10$:    NOP                     ;END OF TEST
003422  005237  001472                      INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
 976                                    .SBTTL  TEST # 11 - TEST BIT 0 OF CCR
                                        ;;*****************************************************************
                                        ;*TEST 11        TEST BIT 0 OF CCR
                                        ;*      WRITE ZERO INTO CCR BIT00 THEN READ CCR
                                        ;*      IF CCR IS READ AS ONE THEN CACHE CCR REGISTER MAY BE BAD
                                        ;*      OR CACHE REGISTER DATA PATH COULD BE IN ERROR
                                        ;;*****************************************************************
     003426                             TST11:
     003426  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     003430  003440                             .WORD   40$             ;TEST START LOCATION
     003432  003446                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     003434  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     003436  003460                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     003440                             40$:
 977 003440  012737  001415  177746             MOV     #OFF+BIT08,CCR  ;DISABLE AND FLUSH CACHE
 978 003446  042737  000001  177746  1$:        BIC     #BIT00,CCR      ;WRITE 0
 979 003454  013700  177746                     MOV     CCR,R0          ;SAVE CCR CONTENTS
 980 003460  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     003462  000240                             NOP                     ;FOR  LOOP ON ERROR
 981 003464  032700  000001                     BIT     #BIT00,R0       ;CHECK FOR 0
 982 003470  001403                             BEQ     10$             ;PASS; NXT TEST
 983 003472  104413                             ERROR                   ;ERROR
                                                                        ;-----
     003474  003472                             .WORD   .-2
 984                                                                    ;CCR DATA TEST
 985                                                                    ;WROTE 0 INTO BIT00 CCR; READ 1
 986 003476  000000                             .WORD   0
 987 003500  000240                     10$:    NOP                     ;END OF TEST
     003502  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                                                    .SBTTL  TEST # 12 - TEST CLEARING OF BIT 2 OF CCR
                                                                    ;;*****************************************************************
                                                                    ;*TEST 12        TEST CLEARING OF BIT 2 OF CCR
                                                                    ;*      WRITE ZERO INTO CCR BIT02(FMLO) THEN READ CCR
                                                                    ;*      IF BIT02 IS READ AS ONE THEN CCR REGISTER MAY BE BAD
                                                                    ;*      OR CACHE REGISTER DATA PATH MAY BE AT FAULT
                                                                    ;;*****************************************************************
003506                                                              TST12:
003506  000004                                                              SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                                            ;ERROR/LOOP ON TEST
003510  003520                                                              .WORD   40$                     ;TEST START LOCATION
003512  070000                                                              .WORD   1$-40$+67764            ;LOOP ON ERROR START LOCATION
003514  000000                                                              .WORD   0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
003516  070006                                                              .WORD   25$-40$+67764           ;LOOP ON ERROR END LOCATION
003520  012737  001015  177746                                  40$:     MOV     #OFF,CCR                ;DISABLE CACHE
003526  004437  002452                                                    JSR     R4,RELCTH               ;LOCATE TEST CODE TO HIGH CACHE SPACE
003532  003576                                                            .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                                                    ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                                                    ;ARE RELOCATED TO HI CACHE SPACE

 994 003534  042737  000004  177746                          1$:     BIC     #BIT02,CCR              ;WRITE 0
 995 003542  000240                                          25$:     NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
     003544  000240                                                   NOP                             ;FOR  LOOP ON ERROR
 996 003546  013701  177746                                         MOV     CCR,R1                  ;SAVE CCR CONTENTS
 997 003552  012737  001015  177746                               MOV     #OFF,CCR                ;DISABLE CACHE
 998 003560  032701  000004                                       BIT     #BIT02,R1               ;CHECK FOR 0
 999 003564  001403                                               BEQ     10$                     ;PASS; NXT TEST
1000 003566  104413                                               ERROR                           ;ERROR
                                                                                                    ;-----
     003570  003566                                               .WORD   .-2
1001
1002                                                                                                ;CCR DATA TEST
                                                                                                    ;WROTE 0 INTO CCR BIT02; READ 1
1003 003572  000000                                               .WORD   0
1004 003574  000240                                         10$:  NOP                             ;END OF TEST
     003576  005237  001472                                       INC     $TESTN                  ;INCREMENT TEST COUNTER
```

TEST # 13 - TEST SETTING OF BIT 2 OF CCR

```
1010                                    .SBTTL  TEST # 13 - TEST SETTING OF BIT 2 OF CCR
                                        ;;*****************************************************************
                                        ;*TEST 13       TEST SETTING OF BIT 2 OF CCR
                                        ;*      WRITE ONE INTO CCR BIT02(FMLO) AND ASSURE THAT IT READS  1.
                                        ;*      IF READS BACK AS 0 THEN CCR MAY BE BAD OR CACE DATA PATH
                                        ;*      IS AT FAULT
                                        ;;*****************************************************************
     003602                             TST13:
     003602  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     003604  003614                             .WORD   40$             ;TEST START LOCATION
     003606  003614                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     003610  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     003612  003622                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     003614                             40$:
1011 003614  052737  000004  177746    1$:     BIS     #FMLO,CCR       ;
1012 003622  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     003624  000240                             NOP                     ;FOR  LOOP ON ERROR
1013 003626  032737  000004  177746            BIT     #BIT02,CCR      ;CHECK FOR 1
1014 003634  001003                             BNE     10$             ;PASS
1015 003636  104413                             ERROR                   ;ERROR
                                                                        ;-----
     003640  003636                             .WORD   .-2
1016                                                                    ;CCR DATA TEST
1017                                                                    ;WROTE 1 INTO CCR BIT02; READ 0
1018 003642  000000                             .WORD   0
1019 003644  000240                     10$:    NOP                     ;END OF TEST
     003646  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 14 - TEST CLEARING OF CCR BIT 3

```
1025                                    .SBTTL  TEST # 14 - TEST CLEARING OF CCR BIT 3
                                        ;;*****************************************************************
                                        ;*TEST 14       TEST CLEARING OF CCR BIT 3
                                        ;*      WRITE ZERO INTO CCR BIT03(FMHI) THEN READ CCR
                                        ;*      IF BIT03 READ BACK AS ONE THEN CCR REGISTER BIT MAY BE BAD
                                        ;*      OR CACHE REGISTER DATA PATH MAY BE AT FAULT
                                        ;;*****************************************************************
     003652                             TST14:
     003652  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     003654  003664                             .WORD   40$             ;TEST START LOCATION
     003656  060000                             .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
     003660  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     003662  060012                             .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
     003664  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     003672  004437  002424                     JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
     003676  003742                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

1026 003700  042737  000010  177746  1$:       BIC     #BIT03,CCR      ;WRITE 0
1027 003706  013700  177746                     MOV     CCR,R0          ;SAVE CONTENTS OF CCR
1028 003712  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     003714  000240                             NOP                     ;FOR  LOOP ON ERROR
1029 003716  012737  001015  177746             MOV     #OFF,CCR        ;;DISABLE CACHE
1030 003724  032700  000010                     BIT     #BIT03,R0       ;CHECK FOR 0
1031 003730  001403                             BEQ     10$             ;PASS
1032 003732  104413                             ERROR                   ;ERROR
                                                                        ;-----
     003734  003732                             .WORD   .-2
1033                                                                    ;CCR DATA TEST
1034                                                                    ;WROTE 0 INTO CCR BIT03; READ 1
1035 003736  000000                             .WORD   0
1036 003740  000240                     10$:    NOP                     ;END OF TEST
     003742  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1042                                    .SBTTL  TEST # 15 - TEST SETTING OF CCR BIT 3
                                        ;;*****************************************************************
                                        ;*TEST 15       TEST SETTING OF CCR BIT 3
                                        ;*      WRITE 1 INTO CCR BIT03(FMHI) AND ASSURE IT READS 1.
                                        ;*      IF CCR BIT03 READ AS ZERO THEN CCR REGISTER BIT MAY BE BAD
                                        ;*      OR CACHE REGISTER DATA PATH MAY BE AT FAULT
                                        ;;*****************************************************************
     003746                             TST15:
     003746  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     003750  003760                             .WORD   40$             ;TEST START LOCATION
     003752  003760                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     003754  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     003756  003766                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     003760                             40$:
1043 003760  052737  000010  177746    1$:     BIS     #FMHI,CCR       ;
1044 003766  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     003770  000240                             NOP                     ;FOR  LOOP ON ERROR
1045 003772  032737  000010  177746            BIT     #BIT03,CCR      ;CHECK FOR 1
1046 004000  001003                             BNE     10$             ;PASS
1047 004002  104413                             ERROR                   ;ERROR
                                                                        ;-----
     004004  004002                             .WORD   .-2
1048                                                                    ;CCR DATA TEST
1049                                                                    ;WROTE 1 INTO CCR BIT03; READ 0
1050 004006  000000                             .WORD   0
1051 004010  000240                     10$:    NOP                     ;END OF TEST
     004012  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 16 - TEST CLEARING OF BIT 6 OF CCR
                                ;;*****************************************************************
                                ;*TEST 16       TEST CLEARING OF BIT 6 OF CCR
                                ;*      WRITE 0 INTO CCR BIT06(WWPD) THEN READ CCR
                                ;*      IF BIT06 READ AS ONE THEN CCR REGISTER BIT MAY BE BAD
                                ;*      OR CACHE REGISTER DATA PATH MAY BE AT FAULT
                                ;;*****************************************************************
     004016                     TST16:
     004016  000004                     SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
     004020  004030                     .WORD   40$             ;TEST START LOCATION
     004022  004030                     .WORD   1$              ;LOOP ON ERROR START LOCATION
     004024  000000                     .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004026  004036                     .WORD   25$             ;LOOP ON ERROR END LOCATION
     004030                     40$:
1058 004030  042737  000100  177746 1$:     BIC     #BIT06,CCR      ;WRITE 0
1059 004036  000240             25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004040  000240                     NOP                     ;FOR  LOOP ON ERROR
1060 004042  032737  000100  177746         BIT     #BIT06,CCR      ;CHECK FOR 0
1061 004050  001403                     BEQ     10$             ;PASS
1062 004052  104413                     ERROR                   ;ERROR
                                                                ;-----
     004054  004052                     .WORD   .-2
1063                                                            ;CCR DATA TEST
1064                                                            ;WROTE 0 INTO CCR BIT06; READ 1
1065 004056  000000                     .WORD   0
1066 004060  000240             10$:    NOP                     ;END OF TEST
     004062  005237  001472             INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1072                                    .SBTTL  TEST # 17 - TEST CLEARING OF BIT 7 OF CCR
                                        ;;*****************************************************************
                                        ;*TEST 17       TEST CLEARING OF BIT 7 OF CCR
                                        ;*      WRITE ZERO INTO CCR BIT07(PEA) THEN READ CCR
                                        ;*      IF CCR BIT07 READ AS ONE THEN CCR REGISTER BIT MAY BE BAD
                                        ;*      OR CACHE REGISTER DATA PATH MAY BE AT FAULT
                                        ;;*****************************************************************
     004066                             TST17:
     004066  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     004070  004100                             .WORD   40$             ;TEST START LOCATION
     004072  004100                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     004074  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004076  004106                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     004100                             40$:
1073 004100  042737  000200  177746    1$:     BIC     #BIT07,CCR      ;WRITE 0
1074 004106  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004110  000240                             NOP                     ;FOR  LOOP ON ERROR
1075 004112  032737  000200  177746            BIT     #BIT07,CCR      ;CHECK FOR 0
1076 004120  001403                             BEQ     10$             ;PASS
1077 004122  104413                             ERROR                   ;ERROR
                                                                        ;-----
     004124  004122                             .WORD   .-2
1078                                                                    ;CCR DATA TEST
1079                                                                    ;WROTE 0 INTO CCR BIT07; READ 1
1080 004126  000000                             .WORD   0
1081 004130  000240                     10$:    NOP                     ;END OF TEST
     004132  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1087                                    .SBTTL  TEST # 20 - TEST SETTING OF BIT 7 OF CCR
                                        ;;*****************************************************************
                                        ;*TEST 20        TEST SETTING OF BIT 7 OF CCR
                                        ;*      WRITE ONE INTO CCR BIT07 THEN READ CCR
                                        ;*      IF CCR BIT07 READ AS ZERO THEN CCR REGISTER BIT MAY BE BAD
                                        ;*      OR CACHE REGISTER DATA PATH MAY BE AT FAULT
                                        ;;*****************************************************************
     004136                             TST20:
     004136  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     004140  004150                             .WORD   40$             ;TEST START LOCATION
     004142  004150                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     004144  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004146  004162                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     004150                             40$:
1088 004150  052737  000200  177746    1$:     BIS     #BIT07,CCR      ;WRITE 1
1089 004156  013700  177746                    MOV     CCR,R0          ;SAVE CCR CONTENTS
1090 004162  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004164  000240                             NOP                     ;FOR  LOOP ON ERROR
1091 004166  012737  001015  177746            MOV     #OFF,CCR        ;DISABLE CACHE
1092 004174  032700  000200                    BIT     #BIT07,R0       ;CHECK FOR 1
1093 004200  001003                            BNE     10$             ;PASS
1094 004202  104413                            ERROR                   ;ERROR
                                                                        ;-----
     004204  004202                             .WORD   .-2
1095                                                                    ;CCR DATA TEST
1096                                                                    ;WROTE 1 INTO CCR BIT07; READ 0
1097 004206  000000                             .WORD   0
1098 004210  000240                     10$:    NOP                     ;END OF TEST
     004212  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 21 - TEST CLEARING OF BIT 8 OF CCR

```
1104                                    .SBTTL  TEST # 21 - TEST CLEARING OF BIT 8 OF CCR
                                        ;;*****************************************************************
                                        ;*TEST 21       TEST CLEARING OF BIT 8 OF CCR
                                        ;*      WRITE ZERO INTO CCR BIT08(FC) THEN READ CCR
                                        ;*      IF CCR BIT08 READ AS ONE THEN CCR REGISTER BIT MAY BE BAD
                                        ;*      OR CACHE REGISTER DATA PATH MAY BE AT FAULT
                                        ;;*****************************************************************
     004216                             TST21:
     004216  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     004220  004230                             .WORD   40$             ;TEST START LOCATION
     004222  004230                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     004224  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004226  004236                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     004230                             40$:
1105 004230  042737  000400  177746    1$:     BIC     #BIT08,CCR      ;WRITE 0
1106 004236  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004240  000240                             NOP                     ;FOR  LOOP ON ERROR
1107 004242  032737  000400  177746            BIT     #BIT08,CCR      ;CHECK FOR 0
1108 004250  001401                             BEQ     10$             ;PASS
1109                                                                    ;CCR DATA TEST
1110                                                                    ;WROTE 0 INTO CCR BIT08; READ 1
1111 004252  000000                             .WORD   0
1112 004254  000240                     10$:    NOP                     ;END OF TEST
     004256  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 22 - TEST SETTING OF BIT 9 OF CCR
                                ;;*****************************************************************
                                ;*TEST 22       TEST SETTING OF BIT 9 OF CCR
                                ;*      WRITE 1 INTO CCR BIT09(UCB) AND ASSURE IT READS 1.
                                ;*      IF CCR BIT09 READ AS ZERO THEN CCR REGISTER BIT MAY BE BAD
                                ;*      OR CACHE REGISTER DATA PATH MAY BE AT FAULT
                                ;;*****************************************************************
     004262                     TST22:
     004262  000004                     SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
     004264  004274                     .WORD   40$             ;TEST START LOCATION
     004266  004274                     .WORD   1$              ;LOOP ON ERROR START LOCATION
     004270  000000                     .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004272  004302                     .WORD   25$             ;LOOP ON ERROR END LOCATION
     004274                     40$:
1119 004274  052737  001000  177746 1$:     BIS     #UCB,CCR        ;
1120 004302  000240             25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004304  000240                     NOP                     ;FOR  LOOP ON ERROR
1121 004306  032737  001000  177746         BIT     #BIT09,CCR      ;CHECK FOR 1
1122 004314  001003                     BNE     10$             ;PASS
1123 004316  104413                     ERROR                   ;ERROR
                                                                ;-----
     004320  004316                     .WORD   .-2
1124                                                            ;CCR DATA TEST
1125                                                            ;WROTE 1 INTO CCR BIT09; READ 0
1126 004322  000000                     .WORD   0
1127 004324  000240             10$:    NOP                     ;END OF TEST
     004326  005237  001472             INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 23 - TEST CLEARING BIT 10 OF CCR

```
1131                                    .SBTTL  TEST # 23 - TEST CLEARING BIT 10 OF CCR
                                        ;;*****************************************************************
                                        ;*TEST 23       TEST CLEARING BIT 10 OF CCR
                                        ;*      WRITE ZERO INTO CCR BIT10(WWPT) AND READ 0
                                        ;;*****************************************************************
                                        ;;
     004332                             TST23:
     004332  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     004334  004344                             .WORD   40$             ;TEST START LOCATION
     004336  004344                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     004340  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004342  004352                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     004344                             40$:
1132 004344  042737  002000  177746    1$:     BIC     #BIT10,CCR      ;WRITE 0
1133 004352  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004354  000240                            NOP                     ;FOR  LOOP ON ERROR
1134 004356  032737  002000  177746            BIT     #BIT10,CCR      ;CHECK FOR 0
1135 004364  001403                            BEQ     10$             ;PASS
1136 004366  104413                            ERROR                   ;ERROR
                                                                        ;-----
     004370  004366                            .WORD   .-2
1137                                                                    ;CCR DATA TEST
1138                                                                    ;WROTE 0 INTO CCR BIT 10; READ 1
1139 004372  000000                            .WORD   0
1140 004374  000240                    10$:    NOP                     ;END OF TEST
     004376  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 24 - CACHE CONTROL REGISTER UNUSED BIT TEST(CCR)

```
1145                                    .SBTTL  TEST # 24 - CACHE CONTROL REGISTER UNUSED BIT TEST(CCR)
                                        ;;*****************************************************************
                                        ;*TEST 24       CACHE CONTROL REGISTER UNUSED BIT TEST(CCR)
                                        ;*      WRITE INTO UNUSED CCR REGISTER BIT01 THEN READ CCR
                                        ;*      IF CCR BIT01 READ AS ONE THEN CACHE DATA PATH
                                        ;;*****************************************************************
     004402                             TST24:
     004402  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     004404  004414                             .WORD   40$             ;TEST START LOCATION
     004406  004414                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     004410  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004412  004422                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     004414                             40$:
1146 004414  052737  000002  177746    1$:     BIS     #BIT01,CCR      ;WRITE 1 INTO UNUSED BIT
1147 004422  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004424  000240                             NOP                     ;FOR  LOOP ON ERROR
1148 004426  032737  000002  177746            BIT     #BIT01,CCR      ;CHECK THAT BIT READS 0
1149 004434  001403                             BEQ     10$             ;PASS
1150 004436  104413                             ERROR                   ;ERROR
                                                                        ;-----
     004440  004436                             .WORD   .-2
1151                                                                    ;CCR UNUSED BIT TEST
1152                                                                    ;READ 1 FROM UNUSED CCR BIT01
1153                                                                    ;SHOULD READ 0
1154 004442  000000                             .WORD   0
1155 004444  000240                     10$:    NOP                     ;END OF TEST
     004446  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 25 - TEST UNUSED BIT 4 OF CCR

```
1160                                    .SBTTL  TEST # 25 - TEST UNUSED BIT 4 OF CCR
                                        ;;*****************************************************************
                                        ;*TEST 25       TEST UNUSED BIT 4 OF CCR
                                        ;*      WRITE ONE INTO UNUSED CCR BIT04 THEN READ CCR
                                        ;*      IF CCR BIT04 READ AS ONE THEN CACHE REGISTER DATA PATH ERROR
                                        ;;*****************************************************************
     004452                             TST25:
     004452  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     004454  004464                             .WORD   40$             ;TEST START LOCATION
     004456  004464                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     004460  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004462  004472                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     004464                             40$:
1161 004464  052737  000020  177746    1$:     BIS     #BIT04,CCR      ;WRITE 1 INTO UNUSED BIT
1162 004472  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004474  000240                            NOP                     ;FOR  LOOP ON ERROR
1163 004476  032737  000020  177746            BIT     #BIT04,CCR      ;CHECK THAT BIT READS 0
1164 004504  001403                            BEQ     10$             ;PASS
1165 004506  104413                            ERROR                   ;ERROR
                                                                        ;-----
     004510  004506                            .WORD   .-2
1166                                                                    ;CCR UNUSED BIT TEST
1167                                                                    ;READ 1 FROM UNUSED CCR BIT04
1168                                                                    ;SHOULD READ 0
1169 004512  000000                            .WORD   0
1170 004514  000240                    10$:    NOP                     ;END OF TEST
     004516  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 26 - TEST UNUSED BIT 5 OF CCR

```
1175                                    .SBTTL  TEST # 26 - TEST UNUSED BIT 5 OF CCR
                                        ;;*****************************************************************
                                        ;*TEST 26       TEST UNUSED BIT 5 OF CCR
                                        ;*      WRKTE ONE INTO UNUSED CCR BIT05 THEN READ CCR
                                        ;*      IF CCR BIT05 READ AS ONE THEN CACHE REGISTER DATA PATH ERROR
                                        ;;*****************************************************************
     004522
     004522  000004                    TST26:  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     004524  004534                            .WORD   40$             ;TEST START LOCATION
     004526  004534                            .WORD   1$              ;LOOP ON ERROR START LOCATION
     004530  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004532  004542                            .WORD   25$             ;LOOP ON ERROR END LOCATION
     004534                             40$:
1176 004534  052737  000040  177746    1$:     BIS     #BIT05,CCR      ;WRITE 1 INTO UNUSED BIT
1177 004542  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004544  000240                            NOP                     ;FOR  LOOP ON ERROR
1178 004546  032737  000040  177746            BIT     #BIT05,CCR      ;CHECK THAT BIT READS 0
1179 004554  001403                            BEQ     10$             ;PASS
1180 004556  104413                            ERROR                   ;ERROR
                                                                        ;-----
     004560  004556                            .WORD   .-2
1181                                                                    ;CCR UNUSED BIT TEST
1182                                                                    ;READ 1 FROM UNUSED CCR BIT05
1183                                                                    ;SHOULD READ 0
1184 004562  000000                            .WORD   0
1185 004564  000240                    10$:    NOP                     ;END OF TEST
     004566  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1190                                    .SBTTL  TEST # 27 - TEST UNUSED BIT 8 OF CCR
                                        ;;*****************************************************************
                                        ;*TEST 27       TEST UNUSED BIT 8 OF CCR
                                        ;*      WRITE ONE INTO UNUSED CCR BIT08 THEN READ CCR
                                        ;*      IF CCR BIT08 READ AS ONE THEN CACHE REGISTER DATA PATH ERROR
                                        ;;*****************************************************************
     004572                             TST27:
     004572  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     004574  004604                             .WORD   40$             ;TEST START LOCATION
     004576  004604                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     004600  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004602  004612                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     004604                             40$:
1191 004604  052737  000400  177746    1$:     BIS     #BIT08,CCR      ;WRITE 1 INTO UNUSED BIT
1192 004612  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004614  000240                             NOP                     ;FOR  LOOP ON ERROR
1193 004616  032737  000400  177746            BIT     #BIT08,CCR      ;CHECK THAT BIT READS 0
1194 004624  001403                             BEQ     10$             ;PASS
1195 004626  104413                             ERROR                   ;ERROR
                                                                         ;-----
     004630  004626                             .WORD   .-2
1196                                                                     ;CCR UNUSED BIT TEST
1197                                                                     ;READ 1 FROM UNUSED CCR BIT08
1198                                                                     ;SHOULD READ 0
1199 004632  000000                             .WORD   0
1200 004634  000240                     10$:    NOP                     ;END OF TEST
     004636  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 30 - TEST UNUSED BIT 11 OF CCR

```
1205                                    .SBTTL  TEST # 30 - TEST UNUSED BIT 11 OF CCR
                                        ;;*****************************************************************
                                        ;*TEST 30       TEST UNUSED BIT 11 OF CCR
                                        ;*      WRITE ONE INTO UNUSED CCR BIT11 THEN READ CCR
                                        ;*      IF CCR BIT11 READ AS ONE THEN CACHE REGISTER DATA PATH ERROR
                                        ;;*****************************************************************
     004642                             TST30:
     004642  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     004644  004654                             .WORD   40$             ;TEST START LOCATION
     004646  004654                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     004650  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004652  004662                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     004654                             40$:
1206 004654  052737  004000  177746    1$:     BIS     #BIT11,CCR      ;WRITE 1 INTO UNUSED BIT
1207 004662  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004664  000240                             NOP                     ;FOR  LOOP ON ERROR
1208 004666  032737  004000  177746            BIT     #BIT11,CCR      ;CHECK THAT BIT READS 0
1209 004674  001403                             BEQ     10$             ;PASS
1210 004676  104413                             ERROR                   ;ERROR
                                                                        ;-----
     004700  004676                             .WORD   .-2
1211                                                                    ;CCR UNUSED BIT TEST
1212                                                                    ;READ 1 FROM UNUSED CCR BIT11
1213                                                                    ;SHOULD READ 0
1214 004702  000000                             .WORD   0
1215 004704  000240                     10$:    NOP                     ;END OF TEST
     004706  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1220                                    .SBTTL  TEST # 31 - TEST UNUSED BIT 14 OF CCR
                                        ;;*****************************************************************
                                        ;*TEST 31       TEST UNUSED BIT 14 OF CCR
                                        ;*      WRITE ONE INTO UNUSED CCR BIT14 THEN READ CCR
                                        ;*      IF CCR BIT14 READ AS ONE THEN CACHE REGISTER DATA PATH ERROR
                                        ;;*****************************************************************
     004712                             TST31:
     004712  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     004714  004724                             .WORD   40$             ;TEST START LOCATION
     004716  004724                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     004720  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004722  004732                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     004724                             40$:
1221 004724  052737  040000  177746    1$:     BIS     #BIT14,CCR      ;WRITE 1 INTO UNUSED BIT
1222 004732  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004734  000240                            NOP                     ;FOR  LOOP ON ERROR
1223 004736  032737  040000  177746            BIT     #BIT14,CCR      ;CHECK THAT BIT READS 0
1224 004744  001403                            BEQ     10$             ;PASS
1225 004746  104413                            ERROR                   ;ERROR
                                                                        ;-----
     004750  004746                            .WORD   .-2
1226                                                                    ;CCR UNUSED BIT TEST
1227                                                                    ;READ 1 FROM UNUSED CCR BIT14
1228                                                                    ;SHOULD READ 0
1229 004752  000000                            .WORD   0
1230 004754  000240                    10$:    NOP                     ;END OF TEST
     004756  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1235                                    .SBTTL  TEST # 32 - TEST UNUSED BIT 15 OF CCR
                                        ;;*****************************************************************
                                        ;*TEST 32       TEST UNUSED BIT 15 OF CCR
                                        ;*      WRITE 1 INTO UNUSED CCR BIT15 THEN READ CCR
                                        ;*      IF CCR BIT15 READ AS ONE THEN CACHE REGISTER DATA PATH ERROR
                                        ;;*****************************************************************
     004762                             TST32:
     004762  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     004764  004774                             .WORD   40$             ;TEST START LOCATION
     004766  004774                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     004770  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004772  005002                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     004774                             40$:
1236 004774  052737  100000  177746    1$:     BIS     #BIT15,CCR      ;WRITE 1 INTO UNUSED BIT
1237 005002  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005004  000240                             NOP                     ;FOR  LOOP ON ERROR
1238 005006  032737  100000  177746            BIT     #BIT15,CCR      ;CHECK THAT BIT READS 0
1239 005014  001403                             BEQ     10$             ;PASS
1240 005016  104413                             ERROR                   ;ERROR
                                                                        ;-----
     005020  005016                             .WORD   .-2
1241                                                                    ;CCR UNUSED BIT TEST
1242                                                                    ;READ 1 FROM UNUSED CCR BIT15
1243                                                                    ;SHOULD READ 0
1244 005022  000000                             .WORD   0
1245 005024  000240                     10$:    NOP                     ;END OF TEST
     005026  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 33 - CME UNUSED BIT 0 TEST

```
1250                                    .SBTTL  TEST # 33 - CME UNUSED BIT 0 TEST
                                        ;;*****************************************************************
                                        ;*TEST 33       CME UNUSED BIT 0 TEST
                                        ;*      ATTEMPT WRITE 1 INTO ALL UNUSED BITS OF CME.
                                        ;*      ALL BITS SHOULD READ 0.
                                        ;;*****************************************************************
     005032                             TST33:
     005032  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     005034  005044                             .WORD   40$             ;TEST START LOCATION
     005036  005044                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     005040  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     005042  005052                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     005044                             40$:
1251 005044  052737  000001  177744    1$:     BIS     #BIT00,CME      ;WRITE 1 INTO BIT00
1252 005052  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005054  000240                             NOP                     ;FOR  LOOP ON ERROR
1253 005056  032737  000001  177744            BIT     #BIT00,CME      ;CHECK FOR 0
1254 005064  001403                             BEQ     10$             ;PASS
1255 005066  104413                             ERROR                   ;ERROR
                                                                        ;-----
     005070  005066                             .WORD   .-2
1256                                                                    ;CME UNUSED BIT TEST
1257                                                                    ;READ 1 FROM UNUSED CME BIT00
1258 005072  000000                             .WORD   0
1259 005074  000240                     10$:    NOP                     ;END OF TEST
     005076  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 34 - CME UNUSED BIT 1 TEST

```
1260                                    .SBTTL  TEST # 34 - CME UNUSED BIT 1 TEST
                                        ;;*********************************************************************
                                        ;*TEST 34        CME UNUSED BIT 1 TEST
                                        ;;*********************************************************************
                                        ;
                                        TST34:
     005102
     005102  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     005104  005114                             .WORD   40$             ;TEST START LOCATION
     005106  005114                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     005110  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     005112  005122                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     005114                             40$:
1261 005114  052737  000002  177744    1$:     BIS     #BIT01,CME      ;WRITE 1 INTO BIT01
1262 005122  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005124  000240                             NOP                     ;FOR  LOOP ON ERROR
1263 005126  032737  000002  177744            BIT     #BIT01,CME      ;CHECK FOR 0
1264 005134  001403                             BEQ     10$             ;PASS
1265 005136  104413                             ERROR                   ;ERROR
                                                                         ;-----
     005140  005136                             .WORD   .-2
1266                                                                     ;CME UNUSED BIT TEST
1267                                                                     ;READ 1 FROM UNUSED CME BIT01
1268 005142  000000                             .WORD   0
1269 005144  000240                     10$:    NOP                     ;END OF TEST
     005146  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1270                                    .SBTTL  TEST # 35 - CME UNUSED BIT 2 TEST
                                        ;;*********************************************************************
                                        ;*TEST 35        CME UNUSED BIT 2 TEST
                                        ;;*********************************************************************
                                        TST35:
     005152
     005152  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     005154  005164                             .WORD   40$             ;TEST START LOCATION
     005156  005164                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     005160  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     005162  005172                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     005164                             40$:
1271 005164  052737  000004  177744    1$:     BIS     #BIT02,CME      ;WRITE 1 INTO BIT02
1272 005172  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005174  000240                             NOP                     ;FOR  LOOP ON ERROR
1273 005176  032737  000004  177744            BIT     #BIT02,CME      ;CHECK FOR 0
1274 005204  001403                             BEQ     10$             ;PASS
1275 005206  104413                             ERROR                   ;ERROR
                                                                         ;-----
     005210  005206                             .WORD   .-2
1276                                                                     ;CME UNUSED BIT TEST
1277                                                                     ;READ 1 FROM UNUSED CME BIT02
1278 005212  000000                             .WORD   0
1279 005214  000240                     10$:    NOP                     ;END OF TEST
     005216  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1280                                    .SBTTL  TEST # 36 - CME UNUSED BIT 3 TEST
                                        ;;*****************************************************************
                                        ;*TEST 36       CME UNUSED BIT 3 TEST
                                        ;;*****************************************************************
        005222                          TST36:
        005222  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
        005224  005234                          .WORD   40$             ;TEST START LOCATION
        005226  005234                          .WORD   1$              ;LOOP ON ERROR START LOCATION
        005230  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
        005232  005242                          .WORD   25$             ;LOOP ON ERROR END LOCATION
        005234                          40$:
1281    005234  052737  000010  177744  1$:     BIS     #BIT03,CME      ;WRITE 1 INTO BIT03
1282    005242  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
        005244  000240                          NOP                     ;FOR  LOOP ON ERROR
1283    005246  032737  000010  177744          BIT     #BIT03,CME      ;CHECK FOR 0
1284    005254  001403                          BEQ     10$             ;PASS
1285    005256  104413                          ERROR                   ;ERROR
                                                                        ;-----
        005260  005256                          .WORD   .-2
1286                                                                    ;CME UNUSED BIT TEST
1287                                                                    ;READ 1 FROM UNUSED CME BIT03
1288    005262  000000                          .WORD   0
1289    005264  000240                  10$:    NOP                     ;END OF TEST
        005266  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1290                                    .SBTTL  TEST # 37 - CME UNUSED BIT 4 TEST
                                        ;;*********************************************************************
                                        ;*TEST 37        CME UNUSED BIT 4 TEST
                                        ;;*********************************************************************
                                        ;;
                                        TST37:
        005272
        005272  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
        005274  005304                          .WORD   40$             ;TEST START LOCATION
        005276  005304                          .WORD   1$              ;LOOP ON ERROR START LOCATION
        005300  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
        005302  005312                          .WORD   25$             ;LOOP ON ERROR END LOCATION
        005304                          40$:
1291    005304  052737  000020  177744  1$:     BIS     #BIT04,CME      ;WRITE 1 INTO BIT04
1292    005312  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
        005314  000240                          NOP                     ;FOR  LOOP ON ERROR
1293    005316  032737  000020  177744          BIT     #BIT04,CME      ;CHECK FOR 0
1294    005324  001403                          BEQ     10$             ;PASS
1295    005326  104413                          ERROR                   ;ERROR
                                                                        ;-----
        005330  005326                          .WORD   .-2
1296                                                                    ;CME UNUSED BIT TEST
1297                                                                    ;READ 1 FROM UNUSED CME BIT04
1298    005332  000000                          .WORD   0
1299    005334  000240                  10$:    NOP                     ;END OF TEST
        005336  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1300                                    .SBTTL  TEST # 40 - CME UNUSED BIT 8 TEST
                                        ;;*****************************************************************
                                        ;*TEST 40        CME UNUSED BIT 8 TEST
                                        ;;*****************************************************************
                                        TST40:
     005342
     005342  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     005344  005354                             .WORD   40$             ;TEST START LOCATION
     005346  005354                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     005350  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     005352  005362                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     005354                             40$:
1301 005354  052737  000400  177744    1$:     BIS     #BIT08,CME      ;WRITE 1 INTO BIT08
1302 005362  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005364  000240                             NOP                     ;FOR  LOOP ON ERROR
1303 005366  032737  000400  177744            BIT     #BIT08,CME      ;CHECK FOR 0
1304 005374  001403                             BEQ     10$             ;PASS
1305 005376  104413                             ERROR                   ;ERROR
                                                                         ;-----
     005400  005376                             .WORD   .-2
1306                                                                     ;CME UNUSED BIT TEST
1307                                                                     ;READ 1 FROM UNUSED CME BIT08
1308 005402  000000                             .WORD   0
1309 005404  000240                     10$:    NOP                     ;END OF TEST
     005406  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 41 - CME UNUSED BIT 9 TEST

```
1310                                    .SBTTL  TEST # 41 - CME UNUSED BIT 9 TEST
                                        ;;*****************************************************************
                                        ;*TEST 41        CME UNUSED BIT 9 TEST
                                        ;;*****************************************************************
                                        TST41:
     005412
     005412  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     005414  005424                             .WORD   40$             ;TEST START LOCATION
     005416  005424                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     005420  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     005422  005432                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     005424                             40$:
1311 005424  052737  001000  177744    1$:     BIS     #BIT09,CME      ;WRITE 1 INTO BIT09
1312 005432  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005434  000240                             NOP                     ;FOR  LOOP ON ERROR
1313 005436  032737  001000  177744            BIT     #BIT09,CME      ;CHECK FOR 0
1314 005444  001403                             BEQ     10$             ;PASS
1315 005446  104413                             ERROR                   ;ERROR
                                                                         ;-----
     005450  005446                             .WORD   .-2
1316                                                                     ;CME UNUSED BIT TEST
1317                                                                     ;READ 1 FROM UNUSED CME BIT09
1318 005452  000000                             .WORD   0
1319 005454  000240                     10$:    NOP                     ;END OF TEST
     005456  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 42 - CME UNUSED BIT 10 TEST

```
1320                                    .SBTTL  TEST # 42 - CME UNUSED BIT 10 TEST
                                        ;;*****************************************************************
                                        ;*TEST 42       CME UNUSED BIT 10 TEST
                                        ;;*****************************************************************
                                        TST42:
     005462
     005462  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     005464  005474                             .WORD   40$             ;TEST START LOCATION
     005466  005474                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     005470  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     005472  005502                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     005474                             40$:
1321 005474  052737  002000  177744    1$:     BIS     #BIT10,CME      ;WRITE 1 INTO BIT10
1322 005502  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005504  000240                             NOP                     ;FOR  LOOP ON ERROR
1323 005506  032737  002000  177744            BIT     #BIT10,CME      ;CHECK FOR 0
1324 005514  001403                             BEQ     10$             ;PASS
1325 005516  104413                             ERROR                   ;ERROR
                                                                         ;-----
     005520  005516                             .WORD   .-2
1326                                                                     ;CME UNUSED BIT TEST
1327                                                                     ;READ 1 FROM UNUSED CME BIT10
1328 005522  000000                             .WORD   0
1329 005524  000240                     10$:    NOP                     ;END OF TEST
     005526  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1330                                    .SBTTL  TEST # 43 - CME UNUSED BIT 11 TEST
                                        ;;*****************************************************************
                                        ;*TEST 43       CME UNUSED BIT 11 TEST
                                        ;;*****************************************************************
                                        ;;
                                        TST43:
     005532
     005532  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     005534  005544                             .WORD   40$             ;TEST START LOCATION
     005536  005544                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     005540  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     005542  005552                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     005544                             40$:
1331 005544  052737  004000  177744    1$:     BIS     #BIT11,CME      ;WRITE 1 INTO BIT11
1332 005552  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005554  000240                             NOP                     ;FOR  LOOP ON ERROR
1333 005556  032737  004000  177744            BIT     #BIT11,CME      ;CHECK FOR 0
1334 005564  001403                             BEQ     10$             ;PASS
1335 005566  104413                             ERROR                   ;ERROR
                                                                         ;-----
     005570  005566                             .WORD   .-2
1336                                                                     ;CME UNUSED BIT TEST
1337                                                                     ;READ 1 FROM UNUSED CME BIT11
1338 005572  000000                             .WORD   0
1339 005574  000240                    10$:    NOP                     ;END OF TEST
     005576  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1340                                    .SBTTL  TEST # 44 - CME UNUSED BIT 12 TEST
                                        ;;*********************************************************************
                                        ;*TEST 44        CME UNUSED BIT 12 TEST
                                        ;;*********************************************************************
                                        ;
                                        TST44:
     005602
     005602  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     005604  005614                             .WORD   40$             ;TEST START LOCATION
     005606  005614                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     005610  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     005612  005622                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     005614                             40$:
1341 005614  052737  010000  177744    1$:     BIS     #BIT12,CME      ;WRITE 1 INTO BIT12
1342 005622  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005624  000240                             NOP                     ;FOR  LOOP ON ERROR
1343 005626  032737  010000  177744            BIT     #BIT12,CME      ;CHECK FOR 0
1344 005634  001403                             BEQ     10$             ;PASS
1345 005636  104413                             ERROR                   ;ERROR
                                                                         ;-----
     005640  005636                             .WORD   .-2
1346                                                                     ;CME UNUSED BIT TEST
1347                                                                     ;READ 1 FROM UNUSED CME BIT12
1348 005642  000000                             .WORD   0
1349 005644  000240                     10$:    NOP                     ;END OF TEST
     005646  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 45 - CME UNUSED BIT 13 TEST

```
1350                                    .SBTTL  TEST # 45 - CME UNUSED BIT 13 TEST
                                        ;;*****************************************************************
                                        ;*TEST 45       CME UNUSED BIT 13 TEST
                                        ;;*****************************************************************
                                        ;
                                        TST45:
     005652
     005652  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     005654  005664                             .WORD   40$             ;TEST START LOCATION
     005656  005664                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     005660  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     005662  005672                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     005664                             40$:
1351 005664  052737  020000  177744    1$:     BIS     #BIT13,CME      ;WRITE 1 INTO BIT13
1352 005672  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005674  000240                             NOP                     ;FOR  LOOP ON ERROR
1353 005676  032737  020000  177744            BIT     #BIT13,CME      ;CHECK FOR 0
1354 005704  001403                             BEQ     10$             ;PASS
1355 005706  104413                             ERROR                   ;ERROR
                                                                         ;-----
     005710  005706                             .WORD   .-2
1356                                                                     ;CME UNUSED BIT TEST
1357                                                                     ;READ 1 FROM UNUSED CME BIT13
1358 005712  000000                             .WORD   0
1359 005714  000240                    10$:    NOP                     ;END OF TEST
     005716  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 46 - CME UNUSED BIT 14 TEST

```
1360                                    .SBTTL  TEST # 46 - CME UNUSED BIT 14 TEST
                                        ;;*****************************************************************
                                        ;*TEST 46        CME UNUSED BIT 14 TEST
                                        ;;*****************************************************************
                                        ;
                                        TST46:
     005722
     005722  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     005724  005734                             .WORD   40$             ;TEST START LOCATION
     005726  005734                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     005730  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     005732  005742                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     005734                             40$:
1361 005734  052737  040000  177744    1$:     BIS     #BIT14,CME      ;WRITE 1 INTO BIT14
1362 005742  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005744  000240                             NOP                     ;FOR  LOOP ON ERROR
1363 005746  032737  040000  177744            BIT     #BIT14,CME      ;CHECK FOR 0
1364 005754  001403                             BEQ     10$             ;PASS
1365 005756  104413                             ERROR                   ;ERROR
                                                                         ;-----
     005760  005756                             .WORD   .-2
1366                                                                     ;CME UNUSED BIT TEST
1367                                                                     ;READ 1 FROM UNUSED CME BIT14
1368 005762  000000                             .WORD   0
1369 005764  000240                     10$:    NOP                     ;END OF TEST
     005766  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1375                                    .SBTTL  TEST # 47 - CACHE CONTROL REGISTER BYTE TESTS (CCR)
                                        ;;*****************************************************************
                                        ;*TEST 47       CACHE CONTROL REGISTER BYTE TESTS (CCR)
                                        ;*      REGISTER BYTE SELECTION LOGIC TEST
                                        ;*      WRITE ONE INTO LOW BYTE WRITE ZERO INTO HIGH BYTE
                                        ;*      VERIFY THAT LOW BYTE DATA IS NOT EFFECTED BY WRITE TO HIGH BYTE
                                        ;;*****************************************************************
     005772                             TST47:
     005772  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     005774  006004                             .WORD   40$             ;TEST START LOCATION
     005776  006004                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     006000  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     006002  006020                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     006004                             40$:
1376 006004  152737  000004  177746    1$:     BISB    #BIT02,CCR      ;WRITE 1 INTO CONTROL REGISTER BIT02
1377 006012  142737  000004  177747            BICB    #BIT02,CCR+1    ;WRITE 0 INTO CONTROL REGISTER BIT10
1378 006020  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     006022  000240                             NOP                     ;FOR  LOOP ON ERROR
1379 006024  032737  000004  177746            BIT     #BIT02,CCR      ;CHECK FOR 1
1380 006032  001003                             BNE     10$             ;PASS
1381 006034  104413                             ERROR                   ;ERROR
                                                                         ;-----
     006036  006034                             .WORD   .-2
1382                                                                     ;CACHE CONTROL REGISTER BYTE TESTS
1383                                                                     ;WROTE ONE INTO LOW BYTE BIT02
1384                                                                     ;WROTE ZERO INTO HIGH BYTE BIT10
1385                                                                     ;READ ZERO FROM BIT02
1386 006040  000000                             .WORD   0
1387 006042  000240                     10$:    NOP                     ;END OF TEST
     006044  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 50 - SET TOP BYTE, CLEAR LOW BYTE OF CCR

```
1392                                    .SBTTL  TEST # 50 - SET TOP BYTE, CLEAR LOW BYTE OF CCR
                                        ;;*****************************************************************
                                        ;*TEST 50       SET TOP BYTE, CLEAR LOW BYTE OF CCR
                                        ;*      WRITE ZERO INTO HIGH BYTE WRITE ONE INTO LOW BYTE
                                        ;*      VERIFY HIGH BYTE NOT EFFECTED BY WRITE INTO LOW BYTE
                                        ;;*****************************************************************
     006050                             TST50:
     006050  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     006052  006062                             .WORD   40$             ;TEST START LOCATION
     006054  006062                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     006056  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     006060  006076                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     006062                             40$:
1393 006062  142737  000004  177747    1$:     BICB    #BIT02,CCR+1    ;WRITE 0 INTO CONTROL REGISTER BIT10
1394 006070  152737  000004  177746            BISB    #BIT02,CCR      ;WRITE 1 INTO CONTROL REGISTER BIT02
1395 006076  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     006100  000240                             NOP                     ;FOR  LOOP ON ERROR
1396 006102  032737  002000  177746            BIT     #BIT10,CCR      ;CHECK FOR 0 BIT10
1397 006110  001403                             BEQ     10$             ;PASS
1398 006112  104413                             ERROR                   ;ERROR
                                                                        ;-----
     006114  006112                             .WORD   .-2
1399                                                                    ;CACHE CONTROL REGISTER BYTE TESTS
1400                                                                    ;WROTE ZERO INTO HIGH BYTE BIT10
1401                                                                    ;WROTE ONE INTO LOW BYTE BIT02
1402                                                                    ;READ ZERO FROM BIT02 OR READ ONE FROM BIT10
1403 006116  000000                             .WORD   0
1404 006120  000240                     10$:    NOP                     ;END OF TEST
     006122  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1408                                    .SBTTL  TEST # 51 - CACHE MAINTENANCE REGISTER DATA TEST (CMR)
                                        ;;*****************************************************************
                                        ;*TEST 51       CACHE MAINTENANCE REGISTER DATA TEST (CMR)
                                        ;*      VERIFY CMR BIT00(TDAR) CAN BE WRITTEN TO A 0
                                        ;;*****************************************************************
     006126                             TST51:
     006126  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     006130  006140                             .WORD   40$             ;TEST START LOCATION
     006132  006140                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     006134  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     006136  006152                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     006140                             40$:
1409 006140  042737  000001  177750    1$:     BIC     #BIT00,CMR      ;WRITE 0 INTO CMR BIT00
1410 006146  013700  177750                    MOV     CMR,R0          ;SAVE CONTENTS OF CMR
1411 006152  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     006154  000240                             NOP                     ;FOR  LOOP ON ERROR
1412 006156  005037  177750                    CLR     CMR             ;CLR MAINT
1413 006162  032700  000001                    BIT     #BIT00,R0       ;CHECK FOR 0 IN BIT00
1414 006166  001403                            BEQ     10$             ;PASS
1415 006170  104413                            ERROR                   ;ERROR
                                                                        ;-----
     006172  006170                             .WORD   .-2
1416                                                                    ;MAINTENANCE REGISTER DATA TEST
1417                                                                    ;WROTE 0 INTO CMR BIT00; READ 1
1418 006174  000000                             .WORD   0
1419 006176  000240                     10$:    NOP                     ;END OF TEST
     006200  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1423                                    .SBTTL  TEST # 52 - TEST CMR BIT 0
                                        ;;*****************************************************************
                                        ;*TEST 52        TEST CMR BIT 0
                                        ;*       VERIFY CMR BIT00(TDAR) CAN BE WRITTEN TO A 1
                                        ;;*****************************************************************
                                        ;
                                        TST52:
006204                                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
006204  000004                                                          ;ERROR/LOOP ON TEST
                                                .WORD   40$             ;TEST START LOCATION
006206  006216                                  .WORD   1$              ;LOOP ON ERROR START LOCATION
006210  006216                                  .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
006212  000000                                  .WORD   25$             ;LOOP ON ERROR END LOCATION
006214  006230
006216                                  40$:
1424 006216  052737  000001  177750   1$:     BIS     #BIT00,CMR      ;WRITE 1 INTO CMR BIT00
1425 006224  013700  177750                   MOV     CMR,R0          ;SAVE CONTENTS OF CMR
1426 006230  000240                     25$:   NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
006232  000240                                 NOP                     ;FOR  LOOP ON ERROR
1427 006234  005037  177750                   CLR     CMR             ;CLR MAINT
1428 006240  032700  000001                   BIT     #BIT00,R0       ;CHECK FOR 1 IN BIT00
1429 006244  001003                           BNE     10$             ;PASS
1430 006246  104413                           ERROR                   ;ERROR
                                                                      ;-----
006250  006246                                 .WORD   .-2
1431                                                                  ;MAINTENANCE REGISTER DATA TEST
1432                                                                  ;WROTE 1 INTO CMR BIT00; READ 0
1433 006252  000000                           .WORD   0
1434 006254  000240                     10$:   NOP                     ;END OF TEST
006256  005237  001472                         INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1438                                    .SBTTL  TEST # 53 - TEST BIT 1 OF CMR
                                        ;;*****************************************************************
                                        ;*TEST 53        TEST BIT 1 OF CMR
                                        ;*      VERIFY CMR BIT01(HODO) CAN BE WRITTEN AS A 0.
                                        ;;*****************************************************************
                                        TST53:
     006262
     006262  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     006264  006274                             .WORD   40$             ;TEST START LOCATION
     006266  006274                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     006270  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     006272  006306                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     006274                             40$:
1439 006274  042737  000002  177750    1$:     BIC     #BIT01,CMR      ;WRITE 0 INTO CMR BIT01
1440 006302  013700  177750                    MOV     CMR,R0          ;SAVE CONTENTS OF CMR
1441 006306  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     006310  000240                             NOP                     ;FOR  LOOP ON ERROR
1442 006312  005037  177750                    CLR     CMR             ;CLR MAINT
1443 006316  032700  000002                    BIT     #BIT01,R0       ;CHECK FOR 0 IN BIT01
1444 006322  001403                            BEQ     10$             ;PASS
1445 006324  104413                            ERROR                   ;ERROR
                                                                        ;-----
     006326  006324                            .WORD   .-2
1446                                                                    ;MAINTENANCE REGISTER DATA TEST
1447                                                                    ;WROTE 0 INTO CMR BIT01; READ 1
1448 006330  000000                            .WORD   0
1449 006332  000240                     10$:    NOP                     ;END OF TEST
     006334  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1453                                    .SBTTL  TEST # 54 - TEST CMR BIT 1
                                        ;;*****************************************************************
                                        ;*TEST 54        TEST CMR BIT 1
                                        ;*      VERIFY CMR BIT01(HODO) CAN BE WRITTEN AS A 1.
                                        ;;*****************************************************************
        006340                          TST54:
        006340  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
        006342  006352                  .WORD   40$                     ;TEST START LOCATION
        006344  006352                  .WORD   1$                      ;LOOP ON ERROR START LOCATION
        006346  000000                  .WORD   0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
        006350  006364                  .WORD   25$                     ;LOOP ON ERROR END LOCATION
        006352                          40$:
1454    006352  052737  000002  177750  1$:     BIS     #BIT01,CMR      ;WRITE 1 INTO CMR BIT01
1455    006360  013700  177750          MOV     CMR,R0                  ;SAVE CONTENTS OF CMR
1456    006364  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
        006366  000240                  NOP                             ;FOR  LOOP ON ERROR
1457    006370  005037  177750          CLR     CMR                     ;CLR MAINT
1458    006374  032700  000002          BIT     #BIT01,R0               ;CHECK FOR 1 IN BIT01
1459    006400  001003                  BNE     10$                     ;PASS
1460    006402  104413                  ERROR                           ;ERROR
                                                                        ;-----
        006404  006402                  .WORD   .-2
1461                                                                    ;MAINTENANCE REGISTER DATA TEST
1462                                                                    ;WROTE 1 INTO CMR BIT01; READ 0
1463    006406  000000                  .WORD   0
1464    006410  000240                  10$:    NOP                     ;END OF TEST
        006412  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1468                                    .SBTTL  TEST # 55 - TEST CMR BIT 3
                                        ;;*****************************************************************
                                        ;*TEST 55        TEST CMR BIT 3
                                        ;*        VERIFY CMR BIT03(AM) CAN BE WRITTEN AS A 0.
                                        ;;*****************************************************************
                                        ;
                                        TST55:
006416
006416  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
006420  006430                                  .WORD   40$             ;TEST START LOCATION
006422  006430                                  .WORD   1$              ;LOOP ON ERROR START LOCATION
006424  000000                                  .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
006426  006454                                  .WORD   25$             ;LOOP ON ERROR END LOCATION
006430                                  40$:
1469 006430  012737  177777  177752    1$:     MOV     #-1,CHR         ;ALL 1'S TO AMR
1470 006436  112737  000374  177751            MOVB    #374,CMR+1
1471 006444  105037  177750                    CLRB    CMR             ;WRITE 0 INTO CMR BIT03
1472 006450  013700  177750                    MOV     CMR,R0          ;SAVE CONTENTS OF CMR
1473 006454  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
006456  000240                                  NOP                     ;FOR  LOOP ON ERROR
1474 006460  005037  177750                    CLR     CMR             ;CLR MAINT
1475 006464  032700  000010                    BIT     #BIT03,R0       ;CHECK FOR 0 IN BIT03
1476 006470  001403                            BEQ     10$             ;PASS
1477 006472  104413                            ERROR                   ;ERROR
                                                                        ;-----
006474  006472                                  .WORD   .-2
1478                                                                    ;MAINTENANCE REGISTER DATA TEST
1479                                                                    ;WROTE 0 INTO CMR BIT03; READ 1
1480 006476  000000                            .WORD   0
1481 006500  000240                    10$:    NOP                     ;END OF TEST
006502  005237  001472                          INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1485                                    .SBTTL  TEST # 56 - TEST CMR BIT 3
                                        ;;*****************************************************************
                                        ;*TEST 56       TEST CMR BIT 3
                                        ;*      VERIFY BIT03(AM) CAN BE WRITTEN AS A 1.
                                        ;;*****************************************************************
        006506                          TST56:
        006506  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
        006510  006520                          .WORD   40$             ;TEST START LOCATION
        006512  006520                          .WORD   1$              ;LOOP ON ERROR START LOCATION
        006514  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
        006516  006552                          .WORD   25$             ;LOOP ON ERROR END LOCATION
        006520                          40$:
1486    006520  012737  177777  177752  1$:     MOV     #-1,CHR
1487    006526  112737  000374  177751          MOVB    #374,CMR+1
1488    006534  105037  177750                  CLRB    CMR             ;PRECONDITION AM BIT TO 0
1489    006540  112737  000010  177750          MOVB    #AM,CMR         ;WRITE 1 INTO AM BIT
1490    006546  013700  177750                  MOV     CMR,R0          ;SAVE CONTENTS OF CMR
1491    006552  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
        006554  000240                          NOP                     ;FOR  LOOP ON ERROR
1492    006556  005037  177750                  CLR     CMR             ;CLR MAINT
1493    006562  032700  000010                  BIT     #BIT03,R0       ;CHECK FOR 1 IN BIT03
1494    006566  001003                          BNE     10$             ;PASS
1495    006570  104413                          ERROR                   ;ERROR
                                                                        ;-----
        006572  006570                          .WORD   .-2
1496                                                                    ;MAINTENANCE REGISTER DATA TEST
1497                                                                    ;WROTE 1 INTO CMR BIT03; READ 0
1498    006574  000000                          .WORD   0
1499    006576  000240                  10$:    NOP                     ;END OF TEST
        006600  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1504                                    .SBTTL  TEST # 57 - TEST UNUSED BIT 5 IN THE CMR
                                        ;;*****************************************************************
                                        ;*TEST 57       TEST UNUSED BIT 5 IN THE CMR
                                        ;*      ATTEMPT WRITE 1 INTO ALL UNUSED BITS OF CMR. ALL
                                        ;*      BITS SHOULD READ 0.
                                        ;;*****************************************************************
     006604                             TST57:
     006604  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     006606  006616                             .WORD   40$             ;TEST START LOCATION
     006610  006616                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     006612  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     006614  006624                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     006616                             40$:
1505 006616  052737  000040  177750    1$:     BIS     #BIT05,CMR      ;WRITE 1 INTO BIT05
1506 006624  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     006626  000240                             NOP                     ;FOR  LOOP ON ERROR
1507 006630  032737  000040  177750            BIT     #BIT05,CMR      ;CHECK FOR 0
1508 006636  001403                             BEQ     10$             ;PASS
1509 006640  104413                             ERROR                   ;ERROR
                                                                         ;-----
     006642  006640                             .WORD   .-2
1510                                                                     ;CMR UNUSED BIT TEST
1511                                                                     ;READ 1 FROM UNUSED CMR BIT05
1512 006644  000000                             .WORD   0
1513 006646  000240                     10$:    NOP                     ;END OF TEST
     006650  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 60 - TEST UNUSED BIT 6 IN THE CMR

```
1514                                    .SBTTL  TEST # 60 - TEST UNUSED BIT 6 IN THE CMR
                                        ;;*****************************************************************
                                        ;*TEST 60        TEST UNUSED BIT 6 IN THE CMR
                                        ;;*****************************************************************
                                        TST60:
     006654
     006654  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     006656  006666                             .WORD   40$             ;TEST START LOCATION
     006660  006666                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     006662  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     006664  006674                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     006666                             40$:
1515 006666  052737  000100  177750    1$:     BIS     #BIT06,CMR      ;WRITE 1 INTO BIT06
1516 006674  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     006676  000240                             NOP                     ;FOR  LOOP ON ERROR
1517 006700  032737  000100  177750            BIT     #BIT06,CMR      ;CHECK FOR 0
1518 006706  001403                             BEQ     10$             ;PASS
1519 006710  104413                             ERROR                   ;ERROR
                                                                         ;-----
     006712  006710                             .WORD   .-2
1520                                                                     ;CMR UNUSED BIT TEST
1521                                                                     ;READ 1 FROM UNUSED CMR BIT02
1522 006714  000000                             .WORD   0
1523 006716  000240                     10$:    NOP                     ;END OF TEST
     006720  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 61 - TEST UNUSED BIT 7 IN THE CMR

```
1524                                    .SBTTL  TEST # 61 - TEST UNUSED BIT 7 IN THE CMR
                                        ;;**********************************************************************
                                        ;*TEST 61        TEST UNUSED BIT 7 IN THE CMR
                                        ;;**********************************************************************
                                        ;;
      006724                            TST61:
      006724  000004                           SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      006726  006736                            .WORD   40$             ;TEST START LOCATION
      006730  006736                            .WORD   1$              ;LOOP ON ERROR START LOCATION
      006732  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      006734  006744                            .WORD   25$             ;LOOP ON ERROR END LOCATION
      006736                            40$:
1525  006736  052737  000200  177750  1$:     BIS     #BIT07,CMR      ;WRITE 1 INTO BIT07
1526  006744  000240                   25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      006746  000240                           NOP                     ;FOR  LOOP ON ERROR
1527  006750  032737  000200  177750          BIT     #BIT07,CMR      ;CHECK FOR 0
1528  006756  001403                           BEQ     10$             ;PASS
1529  006760  104413                           ERROR                   ;ERROR
                                                                        ;-----
      006762  006760                           .WORD   .-2
1530                                                                    ;CMR UNUSED BIT TEST
1531                                                                    ;READ 1 FROM UNUSED CMR BIT03
1532  006764  000000                           .WORD   0
1533  006766  000240                   10$:    NOP                     ;END OF TEST
      006770  005237  001472                   INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1540                                    .SBTTL  TEST # 62 - TEST AMR
                                        ;;*****************************************************************
                                        ;*TEST 62        TEST AMR
                                        ;*      MA<21:0> ADDRESS LINES ALL 1'S
                                        ;*      CA<21:0> ADDRESS LINES ALL 0'S
                                        ;*      AMR<21:0> DATA LINES ALL 0'S
                                        ;*      AM BIT SHOULD READ 1.
                                        ;;*****************************************************************
        006774                          TST62:
        006774  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
        006776  007006                          .WORD   40$             ;TEST START LOCATION
        007000  007006                          .WORD   1$              ;LOOP ON ERROR START LOCATION
        007002  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
        007004  007046                          .WORD   25$             ;LOOP ON ERROR END LOCATION
        007006                          40$:
1541    007006  012737  177777  177752  1$:     MOV     #-1,CHR         ;ALL 1'S TO AMR
1542    007014  112737  000374  177751          MOVB    #374,CMR+1
1543    007022  105037  177750                  CLRB    CMR             ;PRECONDITION AM BIT TO 0
1544    007026  005037  177752                  CLR     CHR             ;ALL 0'S TO AMR<21:0>
1545    007032  105037  177751                  CLRB    CMR+1
1546    007036  005737  000000                  TST     0               ;PLACE ALL 0'S ON CA<21:0>.HOWEVER,
1547                                                                    ;THIS IS NOT WHEN THE AM BIT IS SET:
1548                                                                    ;WHEN PAX ADDRESS LINES ARE NOT BEING
1549                                                                    ;ACCESSED BY THE CPU, THE CACHE DEFAULTS
1550                                                                    ;TO SELECTING MA<21:0> ADDRESS LINES.
1551                                                                    ;IN THIS SITUATION, MA<21:0> DEFAULTS
1552                                                                    ;TO ALL 1'S THEREBY PLACING ALL 0'S
1553                                                                    ;ON CA<21:0>.  THEREFORE, FOLLOWING THE LOADING
1554                                                                    ;OF ALL 0'S INTO AMR<21:0>,AND BEFORE THE
1555                                                                    ;'TST 0' INSTRUCTION, THE AM BIT SHOULD
1556                                                                    ;BE SET DUE TO MATCH BETWEEN AMR<21:0> AND CA<21:0>
1557                                                                    ; ADDRESS LINES.
1558    007042  013703  177750          MOV     CMR,R3                 ;SAVE AM BIT RESULT IN CMR
1559    007046  000240          25$:    NOP                            ;INSTRUCTION 'JMP 1$' PLACED HERE
        007050  000240                  NOP                            ;FOR  LOOP ON ERROR
1560    007052  032703  000010          BIT     #AM,R3                 ;AM BIT SHOULD READ 1 INDICATING MATCH
1561    007056  001003                  BNE     10$                    ;PASS
1562    007060  104413                  ERROR                          ;ERROR
                                                                       ;-----
        007062  007060                  .WORD   .-2
1563                                                                   ;AMR TESTS
1564                                                                   ;AMR BIT DID NOT READ 1 INDICATING
1565                                                                   ;A MATCH OF ALL 0'S BETWEEN MA TO CA<21:0>
1566                                                                   ;ADDRESS LINES AND AMR<21:0> DATA
1567    007064  000000                  .WORD   0                      ;ERROR PRINT TERMIN.
1568    007066  000240          10$:    NOP                            ;END OF TEST
        007070  005237  001472          INC     $TESTN                 ;INCREMENT TEST COUNTER
1569                                    .SBTTL  MEMORY MANAGEMENT AND UNIBUS MAP REGISTERS SETUP
1570
1571                                    ;;*****************************************************************
1572                                    ;*      MEMORY MANAGEMENT SETUP
1573                                    ;;*****************************************************************
1574    007074  012737  077406  172300  MAGPRE: MOV     #77406,KPDR0   ;ALLOW ALL ACCESS TO KERNEL PAGE 0
1575    007102  012737  077406  172302          MOV     #77406,KPDR1   ;ALLOW ALL ACCESS TO KERNEL PAGE 1
1576    007110  012737  077406  172304          MOV     #77406,KPDR2   ;ALLOW ALL ACCESS TO KERNEL PAGE 2
1577    007116  012737  077406  172306          MOV     #77406,KPDR3   ;ALLOW ALL ACCESS TO KERNEL PAGE 3
```

MEMORY MANAGEMENT AND UNIBUS MAP REGISTERS SETUP

```
1578 007124  012737  077406  172310          MOV     #77406,KPDR4    ;ALLOW ALL ACCESS TO KERNEL PAGE 4
1579 007132  012737  077406  172312          MOV     #77406,KPDR5    ;ALLOW ALL ACCESS TO KERNEL PAGE 5
1580 007140  012737  077406  172314          MOV     #77406,KPDR6    ;ALLOW ALL ACCESS TO KERNEL PAGE 6
1581 007146  012737  077406  172316          MOV     #77406,KPDR7    ;ALLOW ALL ACCESS TO KERNEL PAGE 7
1582 007154  005037  172340                  CLR     KPAR0           ;MAP PAGE 0 FOR 0-4K
1583 007160  012737  000200  172342          MOV     #200,KPAR1      ;MAP PAGE 1 FOR 4-8K
1584 007166  012737  000400  172344          MOV     #400,KPAR2      ;MAP PAGE 2 FOR 8-12K
1585 007174  012737  000600  172346          MOV     #600,KPAR3      ;MAP PAGE 3 FOR 12-16K
1586 007202  012737  177600  172356          MOV     #177600,KPAR7   ;MAP PAGE 7 FOR 124-128K
1587
1588                                ;;*****************************************************************
1589                                ;*       UNIBUS MAP REGISTERS SETUP
1590                                ;;*****************************************************************
1591 007210  012737  000000  170200          MOV     #0,UMPR00       ;MAP REGISTER SET 0 FOR 0-4K
1592 007216  012737  000000  170202          MOV     #0,UMPR01
1593 007224  012737  020000  170204          MOV     #20000,UMPR02   ;MAP REGISTER SET 1 FOR 4K-8K
1594 007232  012737  000000  170206          MOV     #0,UMPR03
1595 007240  012737  040000  170210          MOV     #40000,UMPR04   ;MAP REGISTER SET 2 FOR 8K-12K
1596 007246  012737  000000  170212          MOV     #0,UMPR05
1597 007254  012737  060000  170214          MOV     #60000,UMPR06   ;MAP REGISTER SET 3 FOR 12K-16K
1598 007262  012737  000000  170216          MOV     #0,UMPR07
```

```
1605                                    .SBTTL  TEST # 63 - AMR CHECK
                                        ;;*****************************************************************
                                        ;*TEST 63        AMR CHECK
                                        ;*      MA<21:0> ADDRESS LINES ALL 0'S
                                        ;*      CA<21:0> ADDRESS LINES ALL 1'S
                                        ;*      AMR<21:0> DATA LINES ALL 1'S
                                        ;*           AM BIT SHOULD READ 1.
                                        ;;*****************************************************************
     007270                             TST63:
     007270  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     007272  007302                             .WORD   40$             ;TEST START LOCATION
     007274  007302                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     007276  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     007300  007326                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     007302                             40$:
1606 007302  012737  177777  177752    1$:     MOV     #-1,CHR         ;LOAD AMR<15:0> WITH 1'S FROM CHR<15:0>
1607 007310  112737  000374  177751            MOVB    #374,CMR+1      ;LOAD AMR<21:16> ALL 1'S
1608 007316  105037  177750                     CLRB    CMR             ;PRECONDITION AM BIT TO 0
1609 007322  105737  177777                     TSTB    177777          ;PUT ALL 1'S ON MA AND PA ADDRESS LINES
1610                                                                    ;MA WILL BE SELECTED
1611 007326  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     007330  000240                             NOP                     ;FOR  LOOP ON ERROR
1612 007332  032737  000010  177750            BIT     #AM,CMR         ;AM BIT SHOULD READ 1 INDICATING MATCH
1613 007340  001003                             BNE     10$             ;PASS
1614 007342  104413                             ERROR                   ;ERROR
                                                                        ;-----
     007344  007342                             .WORD   .-2
1615                                                                    ;AMR TESTS
1616                                                                    ;AMR BIT DID NOT READ 1 INDICATING
1617                                                                    ;A MATCH OF ALL 1'S BETWEEN CA<21:0>
1618                                                                    ;ADRESS LINES AND AMR<21:0> DATA
1619 007346  000000                             .WORD   0               ;ERROR PRINT TERMIN.
1620 007350  000240                     10$:    NOP                     ;END OF TEST
     007352  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 64 - AMR LINES NOT SHORTED & NOT SHORTED TO CA LINES
                                ;;*****************************************************************
                                ;*TEST 64       AMR LINES NOT SHORTED & NOT SHORTED TO CA LINES
                                ;*      MA<21:0> ADDRESS LINES ALL 1'S
                                ;*      CA<21:0> ADDRESS LINES ALL 0'S
                                ;*      AMR<15:0> FLOATING 1 PATTERN
                                ;*           FOR EACH FLOATING 1 PATTERN  AM BIT SHOULD READ 0.
                                ;;*****************************************************************
     007356                     TST64:
     007356  000004                     SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
     007360  007370                     .WORD   40$             ;TEST START LOCATION
     007362  060006                     .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
     007364  000000                     .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     007366  060034                     .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
     007370  012737  001015  177746 40$: MOV     #OFF,CCR        ;DISABLE CACHE
     007376  004437  002424             JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
     007402  007550                     .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO LOW CACHE SPACE

1628 007404  012737  000001  002066      MOV     #1,CHRPAT       ;SETUP 1ST PATTERN FOR CHR<15:0>
1629 007412  013737  002066  177752 1$:  MOV     CHRPAT,CHR      ;LOAD AMR<15:0> FROM CHR<15:0>
1630 007420  105037  177751             CLRB    CMR+1           ;LOAD AMR<21:16> FROM CMR<15:10>
1631 007424  105037  177750             CLRB    CMR             ;PRECONDITION AM BIT TO 0
1632 007430  005737  000000             TST     0               ;PLACE ALL 0'S ON CA<21:0>.
1633                                                            ;WHEN PAX ADDRESS LINES ARE NOT BEING
1634                                                            ;ACCESSED BY THE CPU, THE CACHE DEFAULTS
1635                                                            ;TO SELECTING MA<21:0> ADDRESS LINES.
1636                                                            ;IN THIS SITUATION, MA<21:0> DEFAULTS
1637                                                            ;TO ALL 1'S THEREBY PLACING ALL 0'S
1638                                                            ;ON CA<21:0>.  THEREFORE, FOLLOWING THE LOADING
1639                                                            ;OF ALL 0'S INTO AMR<21:0>,AND BEFORE THE
1640                                                            ;'TST 0' INSTRUCTION,ALL 0'S ARE PLACED
1641                                                            ; ON CA<21:0> ADDRESS LINES.
1642 007434  013703  177750             MOV     CMR,R3          ;SAVE AM BIT RESULT IN CMR
1643 007440  000240             25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     007442  000240                     NOP                     ;FOR  LOOP ON ERROR
1644 007444  032703  000010             BIT     #AM,R3          ;CHECK FOR 0.
1645 007450  001432                     BEQ     9$              ;PASS
1646 007452  005037  050466             CLR     CA210+2         ;PREPARE CA210 FOR TYPEOUT
1647 007456  005037  050464             CLR     CA210
1648 007462  013737  002066  050472     MOV     CHRPAT,AMR210+2 ;PREPARE PATTERN USED FOR AMR<21:0>
1649                                                            ;FOR ERROR TYPEOUT
1650 007470  013737  002066  050470     MOV     CHRPAT,AMR210
1651 007476  012737  000017  002062     MOV     #15.,LOOP
1652 007504  006237  050470     3$:     ASR     AMR210
1653 007510  042737  100000  050470     BIC     #100000,AMR210
1654 007516  005337  002062             DEC     LOOP
1655 007522  001370                     BNE     3$
1656 007524  104413                     ERROR                   ;ERROR
                                                                ;-----
     007526  007524                     .WORD   .-2
1657                                                            ;AMR TESTS
1658                                                            ;AM BIT SHOULD HAVE READ 0 INDICATING A
1659                                                            ;NO-MATCH CONDITION.
```

TEST # 64 - AMR LINES NOT SHORTED & NOT SHORTED TO CA LINES

```
1660 007530  050464                        CA210                ;PRINT PATTERN USED FOR CACHE ADDRESS LINES CA<21:0>
1661 007532  050470                        AMR210               ;PRINT FLOATING 1 PATTERN USED FOR AMR<21:0> DATA
1662 007534  000000                        .WORD   0
1663 007536  006337  002066          9$:   ASL     CHRPAT       ;NEXT FLOATING 1 PATTERN
1664 007542  103401                        BCS     10$          ;IF PHYSICAL ADDRESS 100000 DONE;THEN FINISHED
1665 007544  000722                        BR      1$           ;IF NOT CONTINUE WITH NXT PATTERN
1666 007546  000240                 10$:   NOP                  ;END OF TEST
     007550  005237  001472                INC     $TESTN       ;INCREMENT TEST COUNTER
```

```
1673                                    .SBTTL  TEST # 65 - FLOATING BIT TEST OF AM
                                        ;;*****************************************************************
                                        ;*TEST 65       FLOATING BIT TEST OF AM
                                        ;*      MA<21:0> ADDRESS LINES ALL 1'S
                                        ;*      CA<21:0> ADDRESS LINES ALL 0'S
                                        ;*      AMR<21:16> FLOATING 1 PATTERN
                                        ;*          FOR EACH FLOATING 1 PATTERN  AM BIT SHOULD READ 0.
                                        ;;*****************************************************************
     007554                             TST65:
     007554  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     007556  007566                             .WORD   40$             ;TEST START LOCATION
     007560  060006                             .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
     007562  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     007564  060034                             .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
     007566  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     007574  004437  002424                     JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
     007600  007730                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

1674 007602  012737  000004  002064             MOV     #4,CMRPAT       ;SETUP 1ST PATTERN FOR CMR<21:16>
1675 007610  113737  002064  177751  1$:        MOVB    CMRPAT,CMR+1    ;LOAD AMR<21:16> FROM CMR<15:10>
1676 007616  005037  177752                     CLR     CHR             ;LOAD ALL 0'S TO AMR<15:0> FROM CHR<15:0>
1677 007622  105037  177750                     CLRB    CMR             ;PRECONDITION AM BIT TO 0
1678 007626  005737  000000                     TST     0               ;SAVE CMR CONTENTS.  BEFORE THE FETCH
1679                                                                    ;OF THIS INSTRUCTION, ALL 0'S WILL
1680                                                                    ;BE PLACED ON CA<21:0> LINES.
1681 007632  013703  177750             25$:    MOV     CMR,R3          ;SAVE CMR CONTENTS
1682 007636  000240                             NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     007640  000240                             NOP                     ;FOR  LOOP ON ERROR
1683 007642  032703  000010                     BIT     #AM,R3          ;CHECK FOR 0.
1684 007646  001420                             BEQ     9$              ;PASS
1685 007650  005037  050466                     CLR     CA210+2         ;PREPARE CA210 FOR PRINTOUT
1686 007654  005037  050464                     CLR     CA210
1687 007660  005037  050472                     CLR     AMR210+2        ;PREPARE PATTERN USED FOR AMR<21:0>
1688 007664  013737  002064  050470             MOV     CMRPAT,AMR210
1689 007672  006237  050470                     ASR     AMR210
1690 007676  104413                             ERROR                   ;ERROR
                                                                        ;-----
     007700  007676                             .WORD   .-2
1691                                                                    ;AMR TESTS
1692                                                                    ;AM BIT SHOULD HAVE READ 0 INDICATING A
1693                                                                    ;NO-MATCH CONDITION.
1694 007702  050464                             CA210                   ;PRINT PATTERN USED FOR CACHE ADDRESS LINES CA<21:0>
1695 007704  050470                             AMR210                  ;PRINT FLOATING 1 PATTERN USED FOR AMR<21:0> DATA
1696 007706  000000                             .WORD   0
1697 007710  006337  002064             9$:     ASL     CMRPAT          ;NEXT FLOATING 1 PATTERN
1698 007714  032737  000400  002064             BIT     #400,CMRPAT     ;IF PHYSICAL ADDRESS 10000000 DONE;FINISHED
1699 007722  001001                             BNE     10$
1700 007724  000731                             BR      1$              ;IF NOT CONTINUE WITH NXT PATTERN
1701 007726  000240             10$:    NOP                             ;END OF TEST
     007730  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 66 - VERIFY NO MA TO CA LINES ARE SHORT TO EACH OTHER

```
1708                                    .SBTTL  TEST # 66 - VERIFY NO MA TO CA LINES ARE SHORT TO EACH OTHER
                                        ;;*****************************************************************
                                        ;*TEST 66       VERIFY NO MA TO CA LINES ARE SHORT TO EACH OTHER
                                        ;*      MA<12:0> ADDRESS LINES FLOATING 0
                                        ;*      CA<12:0> ADDRESS LINES FLOATING 1
                                        ;*      AMR<12:0> FLOATING 1 PATTERN
                                        ;*      AM BIT READS 1
                                        ;;*****************************************************************
      007734                            TST66:
      007734  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      007736  007746                            .WORD   40$             ;TEST START LOCATION
      007740  060020                            .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
      007742  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      007744  060114                            .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
      007746  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
      007754  004437  002424                    JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
      007760  010174                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

1709  007762  012737  000001  050516            MOV     #1,FLTPAT       ;1ST FLOATING 1 PATTERN: 00001
1710  007770  012701  100001                    MOV     #100001,R1      ;LOAD VIRTUAL ADDRESS. SELECTS KPAR4
1711                                                                    ;AND SPECIFIES OFFSET FOR PHYSICAL ADDRESS.
1712  007774  012737  170000  172350            MOV     #170000,KPAR4   ;MAP PAGE 4 FOR TOP 124K ADDRESSING.
1713                                                                    ;TOGETHER WITH VIRTUAL ADDRESS WILL
1714                                                                    ;PLACE 17000001 ON PA LINES AND
1715                                                                    ;00000001 ON MA LINES FOR 1ST FLOATING
1716                                                                    ;1 PATTERN.
1717  010002  012737  000001  177572  1$:       MOV     #1,SR0          ;ENABLE MEM. MNGMENT.
1718  010010  012737  000020  172516            MOV     #20,SR3         ;ENABLE 22-BIT MAPPING
1719  010016  013737  050516  177752            MOV     FLTPAT,CHR      ;LOAD AMR WITH FLOATING 1 PATTERN
1720  010024  105037  177751                    CLRB    CMR+1
1721  010030  105037  177750                    CLRB    CMR             ;PRECONDITION AM BIT TO 0
1722  010034  023727  050516  000001            CMP     FLTPAT,#1       ;FOR 1ST PATTERN USE TSTB
1723  010042  001004                            BNE     2$
1724  010044  105711                            TSTB    (R1)            ;
1725  010046  000240                            NOP
1726  010050  000240                            NOP
1727  010052  000403                            BR      4$
1728  010054  005711                  2$:       TST     (R1)            ;
1729  010056  000240                            NOP
1730  010060  000240                            NOP
1731  010062  013703  177750            4$:     MOV     CMR,R3
1732  010066  005037  177572                    CLR     SR0             ;DISABLE MEM. MNGMNT.
1733  010072  005037  172516                    CLR     SR3
1734  010076  000240                  25$:      NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      010100  000240                            NOP                     ;FOR  LOOP ON ERROR
1735  010102  032703  000010                    BIT     #AM,R3          ;CHECK FOR 1
1736  010106  001017                            BNE     9$              ;PASS
1737  010110  013737  050516  050472            MOV     FLTPAT,AMR210+2 ;PREPARE PATTERN USED FOR AMR<21:0>
1738                                                                    ;FOR ERROR TYPEOUT
1739  010116  005037  050470                    CLR     AMR210
1740  010122  013737  050516  050466            MOV     FLTPAT,CA210+2  ;PREPARE PATT. USED FOR CA<21:0 > FOR ERROR TYPE
1741  010130  005037  050464                    CLR     CA210
1742  010134  104413                            ERROR                   ;ERROR
```

```
                                                                                ;-----
     010136  010134                                .WORD   .-2
1743                                                                            ;AMR TESTS
1744                                                                            ;AM BIT DID NOT READ 1
1745 010140  050464                                CA210                        ;PRINT FLOATING 1 PATTERN USED FOR CA<21:0>
1746 010142  050470                                AMR210                       ;PRINT FLOAT 1 PATTRN. USED FOR AMR<21:0>
1747 010144  000000                                .WORD   0
1748 010146  006337  050516            9$:         ASL     FLTPAT               ;NXT PATTERN
1749 010152  032737  020000  050516                BIT     #20000,FLTPAT        ;IF PATTERN 10000 DONE; FINISHED
1750 010160  001004                                BNE     10$
1751 010162  006301                                ASL     R1                   ;IF NOT NEXT PASS
1752 010164  052701  100000                        BIS     #100000,R1
1753 010170  000704                                BR      1$
1754 010172  000240                    10$:        NOP                          ;END OF TEST
     010174  005237  001472                        INC     $TESTN               ;INCREMENT TEST COUNTER
```

```
1761                                    .SBTTL  TEST # 67 - AM FLOATING PATTERN TEST
                                        ;;*****************************************************************
                                        ;*TEST 67       AM FLOATING PATTERN TEST
                                        ;*      MA<21:13> ADDRESS LINES FLOATING 0
                                        ;*      CA<21:13> ADDRESS LINES FLOATING 1
                                        ;*      AMR<21:13> FLOAT. 1 PATTRN.
                                        ;*      AM BIT READS 1
                                        ;;*****************************************************************
     010200                             TST67:
     010200  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     010202  010212                             .WORD   40$             ;TEST START LOCATION
     010204  060036                             .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
     010206  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     010210  060144                             .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
     010212  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     010220  004437  002424                     JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
     010224  010552                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

1762 010226  012737  171000  172350  2$:       MOV     #171000,KPAR4   ;MAP PAGE 4 FOR TOP 124K ADDRESSING
1763                                                                    ;WILL ALSO  SELECT UNIBUS MAP REGISTER
1764                                                                    ;SET #4
1765 010234  012737  000040  050516            MOV     #40,FLTPAT      ;SETUP 1ST PATTERN FOR UMPR09
1766 010242  012737  020000  170220            MOV     #20000,UMPR08   ;SETUP 1ST PATTERN FOR UMPR08
1767                                                                    ;ACCESSING TOP 124K,AND ENABLING
1768                                                                    ;UNIBUS MAP, THE 1ST ADDRESS WILL BE
1769                                                                    ;CONSTRUCTED  THRU THE PA<21:)>
1770                                                                    ;LINES AS 17020000 AND AS 00020000
1771                                                                    ;THRU THE MA<21:0> LINES. DUE TO TOP 124K
1772                                                                    ;ADDRESSING CA<21:0> WILL SELECT THE MA LINES.
1773 010250  012737  000200  002064            MOV     #200,CMRPAT     ;SETUP 1ST PATTERN FOR CMR<15:10>
1774 010256  012737  020000  002066            MOV     #20000,CHRPAT   ;SETUP 1ST PATTERN FOR CHR<15:0>
1775 010264  012737  060126  000004  1$:       MOV     #3$-2$+60000,4  ;
1776 010272  012737  000340  000006            MOV     #340,6
1777 010300  113737  050517  170222            MOVB    FLTPAT+1,UMPR09 ;LOAD UPPER BITS OF UNIBUS MAP REGISTER
1778 010306  113737  002065  177751            MOVB    CMRPAT+1,CMR+1  ;LOAD AMR<21:16> FROM CMR<15:10>
1779 010314  013737  002066  177752            MOV     CHRPAT,CHR      ;LOAD AMR<15:0> FROM CHR<15:0>
1780 010322  012737  000001  177572            MOV     #1,SR0          ;ENABLE MEM MNGMENT
1781 010330  012737  000060  172516            MOV     #60,SR3         ;ENABLE UNIBUS MAP AND 22-BIT MAPPING
1782 010336  105037  177750                    CLRB    CMR             ;PRECONDITION AM BIT WITH 0
1783 010342  005737  100000                    TST     100000          ;TOP 124K ADDRESSING WILL BE DONE PLACING
1784                                                                    ;THE APPROPRIATE FLOATING 1 ADDRESS PATTERN
1785                                                                    ;ON CA<21:0>.HOWEVER, THIS IS NOT WHEN THE
1786                                                                    ;AM BIT IS SET: WHEN PAX ADDRESS LINES ARE
1787                                                                    ;NOT BEING ACCESSED BY THE CPU,THE CACHE
1788                                                                    ;DEFAULTS TO SELECTING MA<21:0> ADDRESS
1789                                                                    ;LINES. IN THIS SITUATION,MA<21:0> DEFAULTS TO
1790                                                                    ;WHATEVER ADDRESS PATTERN IS BEING SET UP
1791                                                                    ;VIA THE UNIBUS MAP.
1792                                                                    ;THEREFORE AFTER THE 'CLRB CMR' INSTRUCTION
1793                                                                    ;AND BEFORE 'TST 100000' THE AM BIT SHOULD
1794                                                                    ;BE SET
1795 010346  000240                    NOP
1796 010350  000240                    NOP
```

```
1797 010352  000401                        BR      4$                  ;NO TRAP
1798 010354  022626                3$:     CMP     (SP)+,(SP)+         ;
1799 010356  013703  177750        4$:     MOV     CMR,R3              ;SAVE CMR CONTENTS
1800 010362  005037  177572                CLR     SR0
1801 010366  005037  172516                CLR     SR3                 ;DISABLE UNIBUS MAP
1802 010372  000240                25$:    NOP                         ;INSTRUCTION 'JMP 1$' PLACED HERE
     010374  000240                        NOP                         ;FOR  LOOP ON ERROR
1803 010376  032703  000010                BIT     #AM,R3              ;CHECK FOR 1
1804 010402  001040                        BNE     9$                  ;PASS
1805 010404  012737  000006  000004        MOV     #6,4
1806 010412  005037  000006                CLR     6
1807 010416  013737  002066  050472        MOV     CHRPAT,AMR210+2 ;PREPARE AMR210 AND CA210 FOR PRINTOUT
1808 010424  013737  002066  050466        MOV     CHRPAT,CA210+2
1809 010432  013737  050516  050470        MOV     FLTPAT,AMR210
1810 010440  013737  050516  050464        MOV     FLTPAT,CA210
1811 010446  012737  000007  002062        MOV     #7,LOOP
1812 010454  006237  050464        6$:     ASR     CA210
1813 010460  006237  050470                ASR     AMR210
1814 010464  005337  002062                DEC     LOOP
1815 010470  001371                        BNE     6$
1816 010472  104413                        ERROR                       ;ERROR
                                                                      ;-----
     010474  010472                        .WORD   .-2
1817                                                                  ;AMR TESTS
1818                                                                  ;AM BIT DIT NOT READ 1
1819 010476  050464                        CA210                       ;PRINT CA<21:0> PATTERN USED
1820 010500  050470                        AMR210                      ;PRINT AMR<21:0> PAT. USED
1821 010502  000000                        0
1822 010504  006337  050516        9$:     ASL     FLTPAT              ;NEXT PATTERN FOR UMPR01
1823 010510  032737  040000  050516        BIT     #40000,FLTPAT   ;IF ADDRESS PATTERN 10000000 DON; FINISHED
1824 010516  001007                        BNE     8$
1825 010520  006337  170220                ASL     UMPR08              ;NEXT PATTERN FOR UMPR08
1826 010524  006337  002064                ASL     CMRPAT              ;NEXT PATTERN FOR CMR<15:10>
1827 010530  006337  002066                ASL     CHRPAT              ;NEXT PATTERN FOR CHR<15:0>
1828 010534  000653                        BR      1$
1829 010536  012737  000006  000004  8$:     MOV     #6,4                ;RESTORE VECTORS
1830 010544  005037  000006                CLR     6
1831 010550  000240                10$:    NOP                         ;END OF TEST
     010552  005237  001472                INC     $TESTN              ;INCREMENT TEST COUNTER
```

```
1838                                    .SBTTL  TEST # 70 - VERIFY NO STUCK PA LINES OR SHORTED TO EACH OTHER
                                        ;;*****************************************************************
                                        ;*TEST 70       VERIFY NO STUCK PA LINES OR SHORTED TO EACH OTHER
                                        ;*      PA<14:0> ADDRESS LINES FLOATING 1
                                        ;*      CA<14:0> ADDRESS LINES FLOATING 1
                                        ;*               AMR<14:0> FLOATING 1 PATTERN
                                        ;*               AM BIT READS 1
                                        ;;*****************************************************************
      010556                            TST70:
      010556  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      010560  010570                            .WORD   40$             ;TEST START LOCATION
      010562  060004                            .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
      010564  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      010566  060034                            .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
      010570  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
      010576  004437  002424                    JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
      010602  010720                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

1839  010604  012701  000001            1$:     MOV     #1,R1           ;R1 CONTAINS IST FLOATING 1 PATTERN: 000001
1840  010610  010137  177752                    MOV     R1,CHR          ;LOAD AMR<15:0> FROM CHR<15:0>
1841  010614  105037  177751                    CLRB    CMR+1           ;LOAD AMR<21:16> FROM CMR<15:10>
1842  010620  105037  177750                    CLRB    CMR             ;PRECONDITION AM BIT TO 0
1843  010624  022701  000001                    CMP     #1,R1           ;IF PATTERN IS 000001 USE TSTB
1844  010630  001002                            BNE     2$
1845  010632  105711                            TSTB    (R1)
1846  010634  000401                            BR      3$
1847  010636  005711                2$:         TST     (R1)            ;READ ADDRESS SPECIFIED IN R1
1848                                                                    ;WHICH WILL PLACE FLOATING 1 PATTERN ON ADDRESS LINES
1849                                                                    ;PA WILL BE SELECTED TO FEED CA LINES.
1850  010640                        3$:
1851  010640  000240                25$:        NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      010642  000240                            NOP                     ;FOR  LOOP ON ERROR
1852  010644  032737  000010  177750            BIT     #AM,CMR         ;CHECK FOR 1
1853  010652  001015                            BNE     9$              ;PASS
1854  010654  010137  050472                    MOV     R1,AMR210+2     ;PREPARE PATTERN USED FOR AMR<21:0>
1855                                                                    ;FOR ERROR TYPE.
1856  010660  005037  050470                    CLR     AMR210
1857  010664  010137  050466                    MOV     R1,CA210+2      ;PREPARE PATTREN USED FOR CA<21:0>
1858  010670  005037  050464                    CLR     CA210
1859  010674  104413                            ERROR                   ;ERROR
                                                                        ;-----
      010676  010674                            .WORD   .-2
1860                                                                    ;AMR TESTS
1861                                                                    ;AM BIT SHOULD HAVE READ 1 INDICATING A
1862                                                                    ;MATCH CONDITION.
1863  010700  050464                            CA210                   ;PRINT FLOATING 1 PATTERN USED FOR
1864                                                                    ;CACHE ADDRESS LINES CA<21:0>
1865  010702  050470                            AMR210                  ;PRINT   PATTERN USED FOR AMR<21:0> DATA
1866  010704  000000                            .WORD   0
1867  010706  006301                9$:         ASL     R1              ;NEXT FLOATING 1 PATTERN
1868  010710  032701  100000                    BIT     #100000,R1      ;IS ADDRESS PATTERN 40000 DONE?
1869  010714  001735                            BEQ     1$              ;NO; CONTINUE
1870  010716  000240                10$:        NOP                     ;END OF TEST
```

TEST # 70 - VERIFY NO STUCK PA LINES OR SHORTED TO EACH OTHER

```
010720  005237  001472                 INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1876                                    .SBTTL  TEST # 71 - AFTER EACH FLOATING 1 PAT. CHECK AM BIT READS 1
                                        ;;*****************************************************************
                                        ;*TEST 71       AFTER EACH FLOATING 1 PAT. CHECK AM BIT READS 1
                                        ;*      PA<21:15> FLOATING 1 PATTERN
                                        ;*      CA<21:15> FLOATING 1 PATTERN
                                        ;*      AMR<21:15> FLOATING 1 PATTERN
                                        ;;*****************************************************************
      010724                            TST71:
      010724  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      010726  010736                            .WORD   40$             ;TEST START LOCATION
      010730  060022                            .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
      010732  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      010734  060116                            .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
      010736  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
      010744  004437  002424                    JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
      010750  011250                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

1877  010752  012737  000002  002064  2$:       MOV     #2,CMRPAT       ;IST PATTERN FOR CMR<15:10>
1878  010760  012737  100000  002066            MOV     #100000,CHRPAT  ;IST PATTERN FOR CHR<15:0>
1879  010766  012737  001000  172350            MOV     #1000,KPAR4     ;SETUP IST PATTRN. FOR PAGE ADDRESS FIELD
1880                                                                    ;KPAR4 CONTAINS THE FLOATING 1
1881                                                                    ;PATTERN AND REPRESENTS THE PAGE ADDRESS FIELD
1882                                                                    ;DATA USED BY MEM. MNGMNT. TO
1883                                                                    ;CONSTRUCT THE PHYSICAL ADDRESS.
1884                                                                    ;1000 IS THE 1ST FLOATING  1 PATTERN
1885                                                                    ;WHICH WILL BE CONSTRUCTED AS PHYS. ADDRESS 100000.
1886  010774  012737  060104  000004  1$:       MOV     #6$-2$+60000,4  ;ALLOW FOR NEX TRAP
1887  011002  012737  000340  000006            MOV     #340,6
1888  011010  113737  002064  177751            MOVB    CMRPAT,CMR+1    ;LOAD AMR<21:16> FROM CMR<15:10>
1889  011016  013737  002066  177752            MOV     CHRPAT,CHR      ;LOAD AMR<15:0> FROM CHR<15:0>
1890  011024  012737  000001  177572            MOV     #1,SR0          ;ENABLE MEM. MNGMNT.
1891  011032  012737  000020  172516            MOV     #20,SR3         ;ENABLE 22-BIT MAPPING
1892  011040  105037  177750                    CLRB    CMR             ;PRECONDITION AM BIT TO 0
1893  011044  005737  100000                    TST     100000          ;WILL CHOOSE KPAR4 FOR ADDRESSING.
1894                                                                    ;PHYSICAL ADDRESS WILL BE DETERMINED
1895                                                                    ;BY FLOATING PATTERN USED.
1896  011050  000240                            NOP
1897  011052  000240                            NOP
1898  011054  000401                            BR      7$              ;NO TRAP
1899  011056  022626                    6$:     CMP     (SP)+,(SP)+     ;ADJUST STACK
1900  011060  005037  177572           7$:     CLR     SR0             ;DISABLE MEM. MNGMNT.
1901  011064  005037  172516                    CLR     SR3
1902  011070  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      011072  000240                            NOP                     ;FOR  LOOP ON ERROR
1903  011074  032737  000010  177750            BIT     #AM,CMR         ;CHECK FOR 1
1904  011102  001044                            BNE     9$              ;PASS
1905  011104  012737  000006  000004            MOV     #6,4
1906  011112  005037  000006                    CLR     6
1907  011116  005037  050472                    CLR     AMR210+2        ;PREPARE PATTERN USED FOR AMR<21:0>
1908                                                                    ;AND CA<21:0> FOR TYPEOUT
1909  011122  005037  050466                    CLR     CA210+2
1910  011126  013737  172350  050470           MOV     KPAR4,AMR210
1911  011134  013737  172350  050464           MOV     KPAR4,CA210
```

```
1912 011142  012737  000011  002062          MOV     #9.,LOOP
1913 011150  006237  050470          5$:     ASR     AMR210
1914 011154  006237  050464                  ASR     CA210
1915 011160  042737  100000  050470          BIC     #100000,AMR210
1916 011166  042737* 100000  050464          BIC     #100000,CA210
1917 011174  005337  002062                  DEC     LOOP
1918 011200  001363                          BNE     5$
1919 011202  104413                          ERROR                   ;ERROR
                                                                     ;-----
     011204  011202                          .WORD   .-2
1920                                                                 ;AMR TESTS
1921 011206  050464                          CA210                   ;PRINT FLOAT. ADDRESS PATTERN USED
1922                                                                 ;FOR CA<21:0>
1923 011210  050470                          AMR210                  ;PRINT PATTERN USED FOR AMR<21:0>
1924 011212  000000                          .WORD   0
1925 011214  006337  172350          9$:     ASL     KPAR4           ;NEXT FLOATING 1 PATTERN
1926 011220  103405                          BCS     8$              ;IF PHYSICAL ADDRESS 10000000 DONE; FINISHED
1927 011222  006337  002064                  ASL     CMRPAT          ;NEXT CMR PATTERN
1928 011226  006337  002066                  ASL     CHRPAT          ;NEXT CHR PATTERN
1929 011232  000660                          BR      1$              ;CONTINUE
1930 011234  012737  000006  000004  8$:     MOV     #6,4            ;RESTORE VECTORS
1931 011242  005037  000006                  CLR     6
1932 011246  000240                  10$:    NOP                     ;END OF TEST
     011250  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 72 - LOADING TAG STORE FROM ADDRESS MATCH REGISTERS

```
1936                                    .SBTTL  TEST # 72 - LOADING TAG STORE FROM ADDRESS MATCH REGISTERS
                                        ;;*****************************************************************
                                        ;*TEST 72       LOADING TAG STORE FROM ADDRESS MATCH REGISTERS
                                        ;*       ALL 0'S TO TAG STORE ADDRESS LOCATION 0000.
                                        ;;*****************************************************************
     011254
     011254  000004                     TST72:
                                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     011256  011266                             .WORD   40$             ;TEST START LOCATION
     011260  070000                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     011262  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     011264  070042                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     011266  012737  001015  177746     40$:    MOV     #OFF,CCR        ;DISABLE CACHE
     011274  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     011300  011436                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

1937 011302  005037  177752             1$:     CLR     CHR             ;LOAD AMR<8:0> BY WRITING ALL 0'S TO CHR<8:0>
1938 011306  112737  000003  177750             MOVB    #HODO+TDAR,CMR  ;ALLOWS CACHE TAG FIELD BITS TO BE
1939                                                                    ;WRITTEN TO CHR<15:07> ONLY DURING
1940                                                                    ;THE DESTINATION MEMORY ACCESS
1941                                                                    ;OF AN INSTRUCTION
1942                                                                    ;ENABLE CACHE TAG FIELD TO BE WRITTEN
1943                                                                    ;INTO FROM AMR<8:0>
1944 011314  012737  000015  177746             MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE TAG STORE
1945 011322  005737  040000                     TST     40000
1946 011326  005737  060000                     TST     60000           ;WRITE INTO TAG STORE
1947 011332  005737  060000                     TST     60000           ;WRITE TAG FIELD DATA FROM CACHE ADDRESS
1948                                                                    ;LOCATION 0000 INTO CHR.
1949 011336  013737  177752  050474             MOV     CHR,CHR157      ;SAVE CHR DATA
1950 011344  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     011346  000240                             NOP                     ;FOR  LOOP ON ERROR
1951 011350  105037  177750                     CLRB    CMR             ;DISABLE MAINTENANCE MODE
1952 011354  012737  001015  177746             MOV     #OFF,CCR
1953 011362  042737  000177  050474             BIC     #177,CHR157     ;PREPARE CHR157 FOR ERROR CHECK
1954 011370  005737  050474                     TST     CHR157          ;BITS <15:07> SHOULD BE ALL 0'S
1955 011374  001417                             BEQ     10$             ;PASS
1956 011376  012737  000007  002062             MOV     #7,LOOP         ;ERROR;PREPARE CHR157 FOR TYPEOUT
1957 011404  006237  050474             2$:     ASR     CHR157
1958 011410  042737  100000  050474             BIC     #100000,CHR157
1959 011416  005337  002062                     DEC     LOOP
1960 011422  001370                             BNE     2$
1961 011424  104413                             ERROR                   ;ERROR
                                                                        ;-----
     011426  011424                             .WORD   .-2
1962                                                                    ;TAG STORE DATA TESTS
1963                                                                    ;READING TAGD<21:13> THRU CHR<15:07>
1964                                                                    ;DID NOT RESULT IN ALL 0'S.
1965 011430  050474                     CHR157                         ;PRINT CHR<15:07>
1966 011432  000000                             .WORD   0
1967 011434  000240                     10$:    NOP                     ;END OF TEST
     011436  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
1971                                    .SBTTL  TEST # 73 - ALL 1'S TO TAG STORE ADDRESS LOCATION 0000
                                        ;;*****************************************************************
                                        ;*TEST 73       ALL 1'S TO TAG STORE ADDRESS LOCATION 0000
                                        ;*      ALL 1'S TO TAG STORE ADDRESS LOCATION 0000
                                        ;;*****************************************************************
                                        ;;
      011442                            TST73:
      011442  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      011444  011454                            .WORD   40$             ;TEST START LOCATION
      011446  070000                            .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
      011450  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      011452  070044                            .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
      011454  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
      011462  004437  002452                    JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
      011466  011630                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

1972  011470  012737  177777  177752  1$:       MOV     #-1,CHR         ;LOAD AMR<8:0> BY WRITING ALL 1'S TO CHR<8:0>
1973  011476  112737  000003  177750            MOVB    #HODO+TDAR,CMR  ;ALLOWS CACHE TAG FIELD BITS TO BE
1974                                                                    ;WRITTEN TO CHR<15:07> ONLY DURING
1975                                                                    ;THE DESTINATION MEMORY ACCESS
1976                                                                    ;OF AN INSTRUCTION
1977                                                                    ;ENABLE CACHE TAG FIELD TO BE WRITTEN
1978                                                                    ;INTO FROM AMR<8:0>
1979  011504  012737  000015  177746            MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE
1980  011512  005737  040000                    TST     40000
1981  011516  005737  060000                    TST     60000           ;WRITE INTO TAG STORE
1982  011522  005737  060000                    TST     60000           ;WRITE TAG FIELD DATA FROM CACHE ADDRESS
1983                                                                    ;LOCATION 0000 INTO CHR.
1984  011526  013737  177752  050474            MOV     CHR,CHR157      ;SAVE CHR DATA
1985  011534  000240                    25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      011536  000240                             NOP                     ;FOR  LOOP ON ERROR
1986  011540  105037  177750                    CLRB    CMR             ;DISABLE MAINTENANCE MODE
1987  011544  012737  001015  177746            MOV     #OFF,CCR
1988  011552  042737  000177  050474            BIC     #177,CHR157
1989  011560  022737  177600  050474            CMP     #177600,CHR157  ;BITS <15:07> SHOULD BE ALL 1'S
1990  011566  001417                            BEQ     10$             ;PASS
1991  011570  012737  000007  002062            MOV     #7,LOOP         ;ERROR;PREPARE CHR157 FOR TYPEOUT
1992  011576  006237  050474            2$:     ASR     CHR157
1993  011602  042737  100000  050474            BIC     #100000,CHR157
1994  011610  005337  002062                    DEC     LOOP
1995  011614  001370                            BNE     2$
1996  011616  104413                            ERROR                   ;ERROR
                                                                        ;-----
      011620  011616                            .WORD   .-2
1997                                                                    ;TAG STORE DATA TESTS
1998                                                                    ;READING TAGD<21:13> THRU CHR<15:07>
1999                                                                    ;DID NOT RESULT IN ALL 1'S.
2000  011622  050474                    CHR157                          ;PRINT CHR<15:07>
2001  011624  000000                            .WORD   0
2002  011626  000240                    10$:     NOP                     ;END OF TEST
      011630  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
2006                                    .SBTTL  TEST # 74 - FLOAT 1 ACROSS 0'S TO TAG STORE ADRS LOC 0
                                        ;;*****************************************************************
                                        ;*TEST 74       FLOAT 1 ACROSS 0'S TO TAG STORE ADRS LOC 0
                                        ;*      FLOAT 1 ACROSS 0'S TO TAG STORE ADDRESS LOCATION 0000
                                        ;;*****************************************************************
     011634                             TST74:
     011634  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     011636  011646                             .WORD   40$             ;TEST START LOCATION
     011640  070006                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     011642  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     011644  070052                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     011646  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     011654  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     011660  012040                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

2007 011662  012737  000001  050500             MOV     #1,CHR80        ;1ST FLOATING 1 PATTERN:001
2008 011670  012737  000015  177746  1$:        MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2009 011676  013737  050500  177752             MOV     CHR80,CHR       ;LOAD AMR<8:0> VIA CHR<8:0> WITH
2010                                            ;FLOATING 1 PATTERN
2011 011704  112737  000003  177750             MOVB    #HODO+TDAR,CMR  ;ALLOWS CACHE TAG FIELD BITS TO BE
2012                                            ;WRITTEN TO CHR<15:07> ONLY DURING
2013                                            ;THE DESTINATION MEMORY ACCESS
2014                                            ;OF AN INSTRUCTION
2015                                            ;ENABLE CACHE TAG FIELD TO BE WRITTEN
2016                                            ;INTO FROM AMR<8:0>
2017 011712  005737  040000                     TST     40000
2018 011716  005737  060000                     TST     60000           ;WRITE INTO TAG STORE
2019 011722  005737  060000                     TST     60000           ;WRITE TAG FIELD DATA FROM CACHE ADDRESS
2020                                            ;LOCATION 0000 INTO CHR.
2021 011726  013737  177752  050474             MOV     CHR,CHR157      ;SAVE CHR DATA
2022 011734  000240                 25$:        NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     011736  000240                             NOP                     ;FOR  LOOP ON ERROR
2023 011740  105037  177750                     CLRB    CMR             ;DISABLE MAINTENANCE MODE
2024 011744  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
2025 011752  012737  000007  002062             MOV     #7,LOOP         ;PREPARE CHR157 FOR COMPARISON
2026 011760  006237  050474         3$:         ASR     CHR157
2027 011764  042737  100000  050474             BIC     #100000,CHR157
2028 011772  005337  002062                     DEC     LOOP
2029 011776  001370                             BNE     3$
2030 012000  023737  050500  050474             CMP     CHR80,CHR157    ;CHECK FOR CORRECT PATTERN
2031 012006  001405                             BEQ     9$              ;PASS
2032 012010  104413                             ERROR                   ;ERROR
                                                ;-----
     012012  012010                             .WORD   .-2
2033                                            ;TAG STORE DATA TESTS
2034                                            ;READING CHR<15:07> FOR TAGD<21:13>
2035                                            ;DID NOT RESULT IN CORRECT FLOATING
2036                                            ;1 PATTERN.
2037 012014  050474                             CHR157                  ;PRINT CHR<15:07>
2038 012016  050500                             CHR80                   ;PRINT FLOATING 1 PATTERN LOADED
2039                                            ;INTO CHR<8:0>
2040 012020  000000                             .WORD   0
2041 012022  006337  050500         9$:         ASL     CHR80           ;NEXT PATTERN
```

TEST # 74 - FLOAT 1 ACROSS 0'S TO TAG STORE ADRS LOC 0

```
2042 012026  032737  001000  050500          BIT     #1000,CHR80     ;IF PATTERN 400 DONE;FINISHED
2043 012034  001715                          BEQ     1$              ;IF NOT, NEXT PASS
2044 012036  000240                  10$:    NOP                     ;END OF TEST
     012040  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
2048                                    .SBTTL  TEST # 75 - CHECK ALL LOW CACHE TAG STORE ADRS LOCS
                                        ;;*****************************************************************
                                        ;*TEST 75       CHECK ALL LOW CACHE TAG STORE ADRS LOCS
                                        ;*      WRITE AND READ 0'S TO ALL LOW CACHE TAG STORE ADDRESS LOCATIONS
                                        ;;*****************************************************************
      012044                            TST75:
      012044  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      012046  012056                            .WORD   40$             ;TEST START LOCATION
      012050  070014                            .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
      012052  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      012054  070044                            .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
      012056  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
      012064  004437  002452                    JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
      012070  012260                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

2049  012072  005037  177752                    CLR     CHR             ;LOAD AMR<8:0> BY WRITING ALL 0'S TO CHR<8:0>
2050  012076  012705  060000                    MOV     #60000,R5       ;ADDRESS 60000 INTO R5
2051  012102  012703  040000                    MOV     #40000,R3       ;ADDRESS 40000 INTO R3
2052  012106  012737  000015  177746  1$:       MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2053  012114  112737  000003  177750            MOVB    #HODO+TDAR,CMR  ;ALLOWS CACHE TAG FIELD BITS TO BE
2054                                                                    ;WRITTEN TO CHR<15:07> ONLY DURING
2055                                                                    ;THE DESTINATION MEMORY ACCESS
2056                                                                    ;OF AN INSTRUCTION
2057                                                                    ;ENABLE CACHE TAG FIELD TO BE WRITTEN
2058                                                                    ;INTO FROM AMR<8:0>
2059  012122  005713                            TST     (R3)            ;
2060  012124  005715                            TST     (R5)            ;WRITE INTO TAG STORE
2061  012126  005715                            TST     (R5)            ;WRITE TAG STORE DATA INTO CHR FROM CACHE ADDRESS
2062                                                                    ;LOCATION SPECIFIED BY CA<12:1> IN R5.
2063  012130  013737  177752  050474            MOV     CHR,CHR157      ;SAVE CHR DATA
2064  012136  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      012140  000240                            NOP                     ;FOR  LOOP ON ERROR
2065  012142  105037  177750                    CLRB    CMR             ;DISABLE MAINTENANCE MODE
2066  012146  012737  001015  177746            MOV     #OFF,CCR        ;DISABLE CACHE
2067  012154  042737  000177  050474            BIC     #177,CHR157     ;PREPARE CHR157 FOR ERROR CHECK
2068  012162  005737  050474                    TST     CHR157          ;BITS <15:07> SHOULD BE ALL 0'S
2069  012166  001424                            BEQ     9$              ;PASS
2070  012170  010537  050466                    MOV     R5,CA210+2      ;SAVE CACHE ADDRESS USED: CA<21:0>
2071  012174  005037  050464                    CLR     CA210
2072  012200  012737  000007  002062            MOV     #7,LOOP         ;ERROR;PREPARE CHR157 FOR TYPEOUT
2073  012206  006237  050474            4$:     ASR     CHR157
2074  012212  042737  100000  050474            BIC     #100000,CHR157
2075  012220  005337  002062                    DEC     LOOP
2076  012224  001370                            BNE     4$
2077  012226  104413                            ERROR                   ;ERROR
                                                                        ;-----
      012230  012226                            .WORD   .-2
2078                                                                    ;TAG STORE DATA TESTS
2079                                                                    ;READING TAGD<21:13> THRU CHR<15:07>
2080                                                                    ;DID NOT RESULT IN ALL 0'S.
2081  012232  050474                    CHR157                          ;PRINT CHR<15:07>
2082  012234  050464                    CA210                           ;PRINT CA<21:0> ADDRESS USED
2083                                                                    ;BITS <12:1> IS THE CACHE TAG STORE ADDRESS
```

TEST # 75 - CHECK ALL LOW CACHE TAG STORE ADRS LOCS

```
2084                                                                    ;LOCATION FAILURE
2085 012236  000000                        .WORD   0
2086 012240  062705  000002          9$:   ADD     #2,R5                ;NEXT CACHE STORE LOCATION
2087 012244  062703  000002                ADD     #2,R3
2088 012250  020527  070000                CMP     R5,#70000            ;HAVE ALL LOW CACHE ADDRESS LOCATIONS BEEN CHECKED?
2089 012254  001314                        BNE     1$                   ;NO
2090 012256  000240                 10$:   NOP                          ;END OF TEST
     012260  005237  001472                INC     $TESTN               ;INCREMENT TEST COUNTER
```

```
2095                                    .SBTTL  TEST # 76 - TEST ALL LOW CACHE TAG STORE LOCATIONS
                                        ;;*****************************************************************
                                        ;*TEST 76       TEST ALL LOW CACHE TAG STORE LOCATIONS
                                        ;*      WRITE AND READ 1'S TO ALL LOW CACHE TAG STORE ADDRESS LOCATIONS
                                        ;*      (0000 TO 37777)
                                        ;;*****************************************************************
     012264                             TST76:
     012264  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     012266  012276                             .WORD   40$             ;TEST START LOCATION
     012270  070016                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     012272  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     012274  070046                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     012276  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     012304  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     012310  012504                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING !0$
                                        ;ARE RELOCATED TO HI CACHE SPACE

2096 012312  012737  177777  177752             MOV     #-1,CHR         ;LOAD AMR<8:0> BY WRITING ALL 1'S TO CHR<8:0>
2097 012320  012705  060000                     MOV     #60000,R5       ;ADDRESS 60000 INTO R5
2098 012324  012703  040000                     MOV     #40000,R3       ;ADDRESS 40000 INTO R3
2099 012330  012737  000015  177746  1$:        MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2100 012336  112737  000003  177750             MOVB    #HODO+TDAR,CMR  ;ALLOWS CACHE TAG FIELD BITS TO BE
2101                                                                    ;WRITTEN TO CHR<15:07> ONLY DURING
2102                                                                    ;THE DESTINATION MEMORY ACCESS
2103                                                                    ;OF AN INSTRUCTION
2104                                                                    ;ENABLE CACHE TAG FIELD TO BE WRITTEN
2105                                                                    ;INTO FROM AMR<8:0>
2106 012344  005713                             TST     (R3)            ;
2107 012346  005715                             TST     (R5)            ;WRITE INTO TAG STORE
2108 012350  005715                             TST     (R5)            ;WRITE TAG STORE DATA INTO CHR FROM CACHE ADDRESS
2109                                                                    ;LOCATION SPECIFIED BY CA<12:1> IN R5
2110 012352  013737  177752  050474             MOV     CHR,CHR157      ;SAVE CHR DATA
2111 012360  000240                 25$:        NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     012362  000240                             NOP                     ;FOR  LOOP ON ERROR
2112 012364  105037  177750                     CLRB    CMR             ;DISABLE MAINTENANCE
2113 012370  012737  001015  177746             MOV     #OFF,CCR
2114 012376  042737  000177  050474             BIC     #177,CHR157
2115 012404  022737  177600  050474             CMP     #177600,CHR157  ;BITS <15:07> SHOULD BE ALL 1'S
2116 012412  001424                             BEQ     9$              ;PASS
2117 012414  010537  050466                     MOV     R5,CA210+2      ;SAVE CACHE ADDRESS USED: CA<21:0>
2118 012420  005037  050464                     CLR     CA210
2119 012424  012737  000007  002062             MOV     #7,LOOP         ;ERROR;PREPARE CHR157 FOR TYPEOUT
2120 012432  006237  050474                 4$: ASR     CHR157
2121 012436  042737  100000  050474             BIC     #100000,CHR157
2122 012444  005337  002062                     DEC     LOOP
2123 012450  001370                             BNE     4$
2124 012452  104413                             ERROR                   ;ERROR
                                                                        ;-----
     012454  012452                             .WORD   .-2
2125                                                                    ;TAG STORE DATA TESTS
2126                                                                    ;READING TAGD<21:13> THRU CHR<15:07>
2127                                                                    ;DID NOT RESULT IN ALL 1'S.
2128 012456  050464                             CA210                   ;PRINT CACHE ADDRESS CA<21:0>
2129 012460  050474                             CHR157                  ;PRINT CHR<15:07>
```

TEST # 76 - TEST ALL LOW CACHE TAG STORE LOCATIONS

```
2130 012462  000000                        .WORD   0
2131 012464  062705  000002        9$:     ADD     #2,R5           ;NEXT CACH LOCATION
2132 012470  062703  000002                ADD     #2,R3
2133 012474  020527  070000                CMP     R5,#70000       ;HAVE ALL LOCATIONS BEEN DONE?
2134 012500  001313                        BNE     1$              ;NO
2135 012502  000240        10$:            NOP                     ;END OF TEST
     012504  005237  001472                INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
2140                                    .SBTTL  TEST # 77 - TEST CLEARING OF ALL HI CACHE TAG STORE LOCATIONS
                                        ;;**********************************************************************
                                        ;*TEST 77       TEST CLEARING OF ALL HI CACHE TAG STORE LOCATIONS
                                        ;*      WRITE AND READ 0'S TO ALL HI CACHE TAG STORE ADDRESS LOCATIONS
                                        ;*      (4000 TO 7777)
                                        ;;**********************************************************************
     012510                             TST77:
     012510  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     012512  012522                             .WORD   40$             ;TEST START LOCATION
     012514  060014                             .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
     012516  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     012520  060044                             .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
     012522  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     012530  004437  002424                     JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
     012534  012724                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

2141 012536  005037  177752                     CLR     CHR             ;LOAD AMR<8:0> BY WRITING ALL 0'S TO CHR<8:0>
2142 012542  012705  070000                     MOV     #70000,R5       ;ADDRESS 70000 INTO R5
2143 012546  012703  050000                     MOV     #50000,R3       ;ADDRESS 50000 INTO R3
2144 012552  012737  000015  177746  1$:       MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2145 012560  112737  000003  177750             MOVB    #HODO+TDAR,CMR  ;ALLOWS CACHE TAG FIELD BITS TO BE
2146                                                                    ;WRITTEN TO CHR<15:07> ONLY DURING
2147                                                                    ;THE DESTINATION MEMORY ACCESS
2148                                                                    ;OF AN INSTRUCTION
2149                                                                    ;ENABLE CACHE TAG FIELD TO BE WRITTEN
2150                                                                    ;INTO FROM AMR<8:0>
2151 012566  005713                             TST     (R3)            ;
2152 012570  005715                             TST     (R5)            ;WRITE INTO TAG STORE
2153 012572  005715                             TST     (R5)            ;WRITE TAG STORE DATA INTO CHR FROM CACHE ADDRESS
2154                                                                    ;LOCATION SPECIFIED BY CA<12:1> IN R5.
2155 012574  013737  177752  050474             MOV     CHR,CHR157      ;SAVE CHR DATA
2156 012602  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     012604  000240                             NOP                     ;FOR  LOOP ON ERROR
2157 012606  105037  177750                     CLRB    CMR             ;DISABLE MAINTENANCE MODE
2158 012612  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
2159 012620  042737  000177  050474             BIC     #177,CHR157     ;PREPARE CHR157 FOR ERROR CHECK
2160 012626  005737  050474                     TST     CHR157          ;BITS <15:07> SHOULD BE ALL 0'S
2161 012632  001424                             BEQ     9$              ;PASS
2162 012634  010537  050466                     MOV     R5,CA210+2      ;SAVE CACHE ADDRESS USED: CA<21:0>
2163 012640  005037  050464                     CLR     CA210
2164 012644  012737  000007  002062             MOV     #7,LOOP         ;ERROR;PREPARE CHR157 FOR TYPEOUT
2165 012652  006237  050474             4$:     ASR     CHR157
2166 012656  042737  100000  050474             BIC     #100000,CHR157
2167 012664  005337  002062                     DEC     LOOP
2168 012670  001370                             BNE     4$
2169 012672  104413                             ERROR                   ;ERROR
                                                                        ;-----
     012674  012672                             .WORD   .-2
2170                                                                    ;TAG STORE DATA TESTS
2171                                                                    ;READING TAGD<21:13> THRU CHR<15:07>
2172                                                                    ;DID NOT RESULT IN ALL 0'S.
2173 012676  050474                     CHR157                         ;PRINT CHR<15:07>
2174 012700  050464                     CA210                          ;PRINT CA<21:0> ADDRESS USED
```

TEST # 77 - TEST CLEARING OF ALL HI CACHE TAG STORE LOCATIONS

```
2175                                                    ;BITS <12:1> IS THE CACHE TAG STORE ADDRESS
2176                                                    ;LOCATION FAILURE
2177 012702  000000                    .WORD   0
2178 012704  062705  000002      9$:    ADD     #2,R5       ;NEXT CACHE STORE LOCATION
2179 012710  062703  000002             ADD     #2,R3
2180 012714  020527  100000             CMP     R5,#100000  ;HAVE ALL HI CACHE ADDRESS LOCATIONS BEEN CHECKED?
2181 012720  001314                     BNE     1$          ;NO
2182 012722  000240            10$:    NOP                 ;END OF TEST
     012724  005237  001472             INC     $TESTN      ;INCREMENT TEST COUNTER
```

TEST # 100 - TEST CLEARING OF ALL HI CACHE TAG STORE LOCATIONS

```
2187                                    .SBTTL  TEST # 100 - TEST CLEARING OF ALL HI CACHE TAG STORE LOCATIONS
                                        ;;**********************************************************************
                                        ;*TEST 100      TEST CLEARING OF ALL HI CACHE TAG STORE LOCATIONS
                                        ;*      WRITE AND READ 1'S TC ALL HI CACHE TAG STORE ADDRESS LOCATIONS
                                        ;*      (4000 TO 7777)
                                        ;;**********************************************************************
      012730                            TST100:
      012730  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      012732  012742                            .WORD   40$             ;TEST START LOCATION
      012734  060016                            .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
      012736  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      012740  060046                            .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
      012742  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
      012750  004437  002424                    JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
      012754  013150                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

2188  012756  012737  177777  177752          MOV     #-1,CHR         ;LOAD AMR<8:0> BY WRITING ALL 1'S TO CHR<8:0>
2189  012764  012705  070000                  MOV     #70000,R5       ;ADDRESS 70000 INTO R5
2190  012770  012703  050000                  MOV     #50000,R3       ;ADDRESS 50000 INTO R3
2191  012774  012737  000015  177746  1$:     MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2192  013002  112737  000003  177750          MOVB    #HODO+TDAR,CMR  ;ALLOWS CACHE TAG FIELD BITS TO BE
2193                                                                  ;WRITTEN TO CHR<15:07> ONLY DURING
2194                                                                  ;THE DESTINATION MEMORY ACCESS
2195                                                                  ;OF AN INSTRUCTION
2196                                                                  ;ENABLE CACHE TAG FIELD TO BE WRITTEN
2197                                                                  ;INTO FROM AMR<8:0>
2198  013010  005713                          TST     (R3)            ;
2199  013012  005715                          TST     (R5)            ;WRITE INTO TAG STORE
2200  013014  005715                          TST     (R5)            ;WRITE TAG STORE DATA INTO CHR FROM CACHE ADDRESS
2201                                                                  ;LOCATION SPECIFIED BY CA<12:1> IN R5
2202  013016  013737  177752  050474          MOV     CHR,CHR157      ;SAVE CHR DATA
2203  013024  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      013026  000240                          NOP                     ;FOR  LOOP ON ERROR
2204  013030  105037  177750                  CLRB    CMR             ;DISABLE MAINTENANCE
2205  013034  012737  001015  177746          MOV     #OFF,CCR
2206  013042  042737  000177  050474          BIC     #177,CHR157
2207  013050  022737  177600  050474          CMP     #177600,CHR157  ;BITS <15:07> SHOULD BE ALL 1'S
2208  013056  001424                          BEQ     9$              ;PASS
2209  013060  010537  050466                  MOV     R5,CA210+2      ;SAVE CACHE ADDRESS USED: CA<21:0>
2210  013064  005037  050464                  CLR     CA210
2211  013070  012737  000007  002062          MOV     #7,LOOP         ;ERROR;PREPARE CHR157 FOR TYPEOUT
2212  013076  006237  050474          4$:     ASR     CHR157
2213  013102  042737  100000  050474          BIC     #100000,CHR157
2214  013110  005337  002062                  DEC     LOOP
2215  013114  001370                          BNE     4$
2216  013116  104413                          ERROR                   ;ERROR
                                                                        ;-----
      013120  013116                          .WORD   .-2
2217                                                                    ;TAG STORE DATA TESTS
2218                                                                    ;READING TAGD<21:13> THRU CHR<15:07>
2219                                                                    ;DID NOT RESULT IN ALL 1'S.
2220  013122  050464                  CA210                           ;PRINT CACHE ADDRESS CA<21:0>
2221  013124  050474                  CHR157                          ;PRINT CHR<15:07>
```

TEST # 100 - TEST CLEARING OF ALL HI CACHE TAG STORE LOCATIONS

```
 2222 013126  000000                        .WORD   0
 2223 013130  062705  000002        9$:     ADD     #2,R5           ;NEXT CACH LOCATION
 2224 013134  062703  000002                ADD     #2,R3
 2225 013140  020527  100000                CMP     R5,#100000      ;HAVE ALL LOCATIONS BEEN DONE?
 2226 013144  001313                        BNE     1$              ;NO
 2227 013146  000240        10$:            NOP                     ;END OF TEST
      013150  005237  001472                INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
2233                                    .SBTTL  TEST # 101 - LOADING TAG STORE FROM CACHE ADRS LINES CA(21:13)
                                        ;;*****************************************************************
                                        ;*TEST 101      LOADING TAG STORE FROM CACHE ADRS LINES CA(21:13)
                                        ;*      CHECK LOADING OF TAG STORE DATA(TAG WRTD<21:13>) FROM
                                        ;*      CACHE ADDRESS LINES CA<21:13>.
                                        ;*      WRITE ALL 0'S IN TAG STORE LOCATION 0000 FROM CA<21:13>
                                        ;;*****************************************************************
     013154                             TST101:
     013154  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     013156  013166                             .WORD   40$             ;TEST START LOCATION
     013160  070000                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     013162  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     013164  070036                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     013166  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     013174  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     013200  013332                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

2234 013202  112737  000002  177750  1$:       MOVB    #HODO,CMR       ;ALLOWS CACHE TAG FIELD BITS TO BE
2235                                                                    ;WRITTEN TO CHR<15:07> ONLY DURING
2236                                                                    ;THE DESTINATION MEMORY ACCESS
2237                                                                    ;OF AN INSTRUCTION
2238 013210  012737  000015  177746            MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2239 013216  005737  040000                     TST     40000
2240 013222  005737  000000                     TST     0               ;WRITE ALL 0'S INTO TAG STORE LOCATION 0000
2241                                                                    ;FROM CACHE ADDRESS CA<21:13>
2242 013226  005737  000000                     TST     0               ;WRITE TAG STORE DATA FROM  LOCATION
2243                                                                    ;0000 INTO CHR<15:07>.
2244 013232  013737  177752  050474            MOV     CHR,CHR157      ;SAVE CHR DATA
2245 013240  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     013242  000240                             NOP                     ;FOR  LOOP ON ERROR
2246 013244  105037  177750                     CLRB    CMR             ;DISABLE MAINTENANCE MODE
2247 013250  012737  001015  177746            MOV     #OFF,CCR        ;DISABLE CACHE
2248 013256  042737  000177  050474            BIC     #177,CHR157     ;PREPARE CHR157 FOR ERROR CHECK
2249 013264  005737  050474                     TST     CHR157          ;BITS <15:07> SHOULD BE ALL 0'S
2250 013270  001417                             BEQ     10$             ;PASS
2251 013272  012737  000007  002062            MOV     #7,LOOP         ;ERROR;PREPARE CHR157 FOR TYPEOUT
2252 013300  006237  050474             2$:     ASR     CHR157
2253 013304  042737  100000  050474            BIC     #100000,CHR157
2254 013312  005337  002062                     DEC     LOOP
2255 013316  001370                             BNE     2$
2256 013320  104413                             ERROR                   ;ERROR
                                                                        ;-----
     013322  013320                             .WORD   .-2
2257                                                                    ;TAG STORE DATA TESTS
2258                                                                    ;READING TAGD<21:13> THRU CHR<15:07>
2259                                                                    ;DID NOT RESULT IN ALL 0'S.
2260 013324  050474                     CHR157: .WORD   0               ;PRINT CHR<15:07>
2261 013326  000000
2262 013330  000240                     10$:    NOP                     ;END OF TEST
     013332  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
2270                                    .SBTTL  TEST # 102 - WRITE FLOATING 1 ACROSS 0'S INTO TAG LOC 0
                                        ;;*****************************************************************
                                        ;*TEST 102      WRITE FLOATING 1 ACROSS 0'S INTO TAG LOC 0
                                        ;*      WRITE FLOATING 1 ACROSS 0'S INTO TAG STORE LOCATION 0000
                                        ;*      FROM CA<21:13> USING AVAILABLE MEMORY.
                                        ;*      PROCEDURE:  STARTING AT 8K BOUNDARY(ADDR. 20000) CHECK
                                        ;*      FOR AVAILABLE FLOATING ADDRESS UP TO ADDR. 10000000
                                        ;*      WHEN THE FLOATING ADDRESS EXISTS PERFORM THE TEST.
                                        ;;*****************************************************************
                                        TST102:
      013336
      013336  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
      013340  013350                            .WORD   40$             ;TEST START LOCATION
      013342  070006                            .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
      013344  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      013346  070100                            .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
      013350  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
      013356  004437  002452                    JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
      013362  013650                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

2271  013364  012737  000200  172350  2$:      MOV     #200,KPAR4      ;KPAR4 CONTAINS THE FLOATING 1 PATTERN
2272                                                                     ;AND REPRESENTS THE THE PAGE ADDRESS FIELD
2273                                                                     ;DATA USED BY MEMORY MNGMNT. TO CONSTRUCT
2274                                                                     ;THE PHYSICAL ADDRESS.  200 IS THE 1ST
2275                                                                     ;FLOATING 1 PATTERN WHICH WILL BE CONSTRUCTED
2276                                                                     ;TO ADDRESS 20000.
2277  013372  012737  070240  000004  1$:      MOV     #7$-2$+70000,4  ;ALLOW FOR NEX TRAP
2278  013400  012737  000340  000006          MOV     #340,6
2279  013406  112737  000002  177750          MOVB    #HODO,CMR       ;ALLOWS CACHE TAG STORE TO BE WRITTEN
2280                                                                     ;TO CHR<15:07> ONLY DURING THE DESTINATION
2281                                                                     ;MEMORY ACCESS OF AN INSTRUCTION.
2282  013414  012737  000001  177572          MOV     #1,SR0          ;ENABLE MEMORY MNGMNT.
2283  013422  012737  000020  172516          MOV     #20,SR3         ;ENABLE 22-BIT MAPPING
2284  013430  012737  000015  177746          MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2285  013436  005737  040000                  TST     40000           ;
2286  013442  005737  100000                  TST     100000          ;CHOOSES KPAR4 FOR ADDRESSING. PHYSICAL
2287                                                                     ;ADDRESS WILL BE DETERMINED BY FLOATING
2288                                                                     ;PATTERN USED IN KPAR4. TAG STORE WILL
2289                                                                     ;BE WRITTEN WITH DATA PLACED ON CA<21:13> ADDRESS LINES.
2290  013446  000240                  NOP
2291  013450  000240                  NOP                             ;NO TRAP
2292  013452  005737  100000                  TST     100000          ;WRITE TAG STOR E DATA FROM LOCATION
2293                                                                     ;0000 INTO CHR<15:07>.
2294  013456  013737  177752  050474          MOV     CHR,CHR157      ;SAVE CHR INFO.
2295  013464  000240          25$:      NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
      013466  000240                    NOP                             ;FOR  LOOP ON ERROR
2296  013470  005037  177572                  CLR     SR0             ;DISABLE MEM MNGMENT.
2297  013474  005037  172516                  CLR     SR3
2298  013500  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
2299  013506  105037  177750                  CLRB    CMR             ;DISABLE MAINTENANCE
2300  013512  042737  000177  050474          BIC     #177,CHR157
2301  013520  023737  172350  050474          CMP     KPAR4,CHR157    ;IS THERE ERROR?
2302  013526  001437                  BEQ     9$                      ;PASS
2303  013530  012737  000006  000004          MOV     #6,4
```

```
2304 013536  005037  000006                    CLR     6
2305 013542  013737  172350  050476            MOV     KPAR4,CA2113    ;SAVE PATTERN USED FOR CA<21:13>.
2306 013550  012737  000007  002062            MOV     #7,LOOP         ;PREPARE CHR157 AND CA2113 FOR ERROR PRINT
2307 013556  006237  050474          5$:       ASR     CHR157
2308 013562  006237  050476                    ASR     CA2113
2309 013566  042737  100000  050474            BIC     #100000,CHR157
2310 013574  042737  100000  050476            BIC     #100000,CA2113
2311 013602  005337  002062                    DEC     LOOP
2312 013606  001363                            BNE     5$
2313 013610  104413                            ERROR                   ;ERROR
                                                                        ;-----
     013612  013610                            .WORD   .-2
2314                                                                    ;TAG STORE TESTS
2315                                                                    ;READING CHR<15:07> FOR TAG DATA (TAGD <21:13>)
2316                                                                    ;DID NOT RESULT IN CORRECT ADDRESS PATTERN
2317                                                                    ;LOADED FROM CA<21:13>.
2318 013614  050474                            CHR157                  ;PRINT CHR<15:07>
2319 013616  050476                            CA2113                  ;PRINT ADDRESS PATTERN USED: CA<21:13>
2320 013620  000000                            .WORD   0               ;PRINT TERMINATE
2321 013622  000401                            BR      9$              ;NEXT PATTERN
2322 013624  022626                  7$:       CMP     (SP)+,(SP)+     ;RESTORE STACK DUE TO INTERRUPT
2323 013626  006337  172350          9$:       ASL     KPAR4           ;NEXT PATTERN;IF PHYSICAL ADDRESS
2324                                                                    ;10000000 HAS BEEN DONE; FINISHED
2325 013632  103257                            BCC     1$
2326 013634  012737  000006  000004            MOV     #6,4            ;RESTORE VECTORS
2327 013642  005037  000006                    CLR     6
2328 013646  000240                  10$:      NOP                     ;END OF TEST
     013650  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                        .SBTTL  TEST # 103 - FLOAT 1 ACROSS 0'S INTO TAG STORE ADRS LOC 0
                        ;;*****************************************************************
                        ;*TEST 103      FLOAT 1 ACROSS 0'S INTO TAG STORE ADRS LOC 0
                        ;*      WRITE FLOATING 1 ACROSS 0'S INTO TAG STORE ADDRESS LOCATION 0000
                        ;*      FROM CA<21:13> USING RMI REGISTER (G5179)
                        ;*      PROCEDURE:  START AT 16K BOUNDARY (ADDR. 100000) AND CHECK FOR
                        ;*      AVAILABLE FLOATING ADRESSES UP TO ADDR. 10000000
                        ;*      WHEREEVER A FLOATING ADDRESS DOES NOT EXIST USE
                        ;*      THE RMI REGISTER. IF ADDRESS EXISTS DO NOT PERFORM
                        ;*      THE TEST SINCE THAT LOCATION WOULD HAVE BEEN TESTED
                        ;*      BY THE PREVIOUS TEST.
                        ;;*****************************************************************
013654                  TST103:
013654  000004                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                        ;ERROR/LOOP ON TEST
013656  013666                  .WORD   40$             ;TEST START LOCATION
013660  070050                  .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
013662  000000                  .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
013664  070166                  .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
013666  012737  001015  177746  40$:    MOV     #OFF,CCR        ;DISABLE CACHE
013674  004437  002452          JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
013700  014426                  .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                        ;ARE RELOCATED TO HI CACHE SPACE

013702  132737  000200  001507  2$:     BITB    #APTSIZE,$ENVM  ;DOES APT SIZE?
013710  001405                  BEQ     11$             ;NO ,GO AUTOSIZE
013712  032737  000200  001512          BIT     #200,$USWR      ;DOES  APT INDICATE
                                                        ;THAT RMI REGISTER IS PRESENT
013720  001006                  BNE     5$              ;YES,USE IT
013722  000555                  BR      4$              ;APT SAYS DO NOT PERFORM TEST
013724  012737  070352  000004  11$:    MOV     #3$-2$+70000,4  ;AUTO-SIZE FOR RMI,PREPARE FOR TRAP
013732  005737  177770          TST     177770          ;READ RMI
013736  012737  001000  172350  5$:     MOV     #1000,KPAR4     ;SETUP MEM. MNG. PAGE 4 FOR FIRST FLOATING
                                                        ;ADDRESS 100000
013744  012737  000002  050516          MOV     #2,FLTPAT       ;SETUP 1ST FLOATING PATTERN FOR RMI
                                                        ;REG. CORRESPONDING TO ADDRESS 40000
013752  012737  070100  000004  1$:     MOV     #8$-2$+70000,4  ;SETUP FOR NEX MEMORY
013760  012737  000001  177572          MOV     #1,SR0          ;ENABLE MEM.MNGMENT.
013766  012737  000020  172516          MOV     #20,SR3         ;ENABLE 22 BIT MAPPING
013774  005737  100000          TST     100000          ;SELECT PAGE 4. READ ADDRESS SPECIFIED BY KPAR4.
014000  000512                  BR      9$              ;NO TRAP.MEMORY LOCATION EXISTS,SO DON'T
                                                        ;BOTHER TESTING WITH RMI FOR THIS LOCATION
014002  022626          8$:     CMP     (SP)+,(SP)+     ;TRAP HERE WHEN FLOATING ADDRESS
                                                        ;LOCATION DOES NOT EXIST.USE RMI FOR TESTING
014004  013701  050516          MOV     FLTPAT,R1       ;PREPARE FLTPAT FOR LOADING INTO RMI
014010  005101                  COM     R1
014012  110137  177770          MOVB    R1,177770       ;LOAD RMI REGISTER
014016  112737  000002  177750  MOVB    #HODO,CMR       ;ALLOWS CACHE TAG STORE TO BE WRITTEN
                                                        ;TO CHR<15:07> DURING THE DESTINATION
                                                        ;MEMORY ACCESS OF AN INSTRUCTION ONLY
014024  012737  000015  177746          MOV     #15,CCR         ;NO UCB TO ENABLE TAG STORE WRITING
014032  052737  000400  177770          BIS     #400,177770     ;ENABLE RMI
014040  005737  040000          TST     40000           ;
014044  005737  100000          TST     100000          ;SELECT PAGE 4 AND READ FLOATING ADDRESS
                                                        ;SPECIFIED BY KPAR4. RMI WILL RESPOND
```

```
                                                                ;RESULTING IN THE TAG STORE BEING LOADED
                                                                ;FROM CA<21:13>
2373 014050  005737  100000              TST     100000         ;WRITE TAG STORE DATA TO CHR<15:07>
2374 014054  013737  177752  050474      MOV     CHR,CHR157     ;SAVE CHR DATA
2375 014062  042737  000400  177770      BIC     #400,177770    ;DISABLE RMI
2376 014070  000240          25$:        NOP                    ;INSTRUCTION 'JMP 1$' PLACED HERE
     014072  000240                      NOP                    ;FOR  LOOP ON ERROR
2377 014074  005037  177572              CLR     SR0            ;DISABLE MEM MNGMENT.
2378 014100  005037  172516              CLR     SR3
2379 014104  012737  001015  177746      MOV     #OFF,CCR       ;DISABLE CACHE
2380 014112  105037  177750              CLRB    CMR            ;DISABLE MAINTENANCE
2381 014116  042737  000177  050474      BIC     #177,CHR157
2382 014124  023737  172350  050474      CMP     KPAR4,CHR157   ;IS THERE ERROR?
2383 014132  001435                      BEQ     9$             ;PASS
2384 014134  012737  000006  000004      MOV     #6,4
2385 014142  005037  000006              CLR     6
2386 014146  013737  172350  050476      MOV     KPAR4,CA2113   ;SAVE PATTERN USED FOR CA<21:13>.
2387 014154  012737  000007  002062      MOV     #7,LOOP        ;PREPARE CHR157 AND CA2113 FOR ERROR PRINT
2388 014162  006237  050474          6$: ASR     CHR157
2389 014166  006237  050476              ASR     CA2113
2390 014172  042737  100000  050474      BIC     #100000,CHR157
2391 014200  042737  100000  050476      BIC     #100000,CA2113
2392 014206  005337  002062              DEC     LOOP
2393 014212  001363                      BNE     6$
2394 014214  104413                      ERROR                  ;ERROR
                                                                ;-----
     014216  014214                      .WORD   .-2
2395                                                            ;TAG STORE TESTS USING RMI REGISTER
2396                                                            ;READING CHR<15:07> FOR TAG DATA (TAGD <21:13>)
2397                                                            ;DID NOT RESULT IN CORRECT ADDRESS PATTERN
2398                                                            ;LOADED FROM CA<21:13>.
2399 014220  050474                      CHR157                 ;PRINT CHR<15:07>
2400 014222  050476                      CA2113                 ;PRINT ADDRESS PATTERN USED: CA<21:13>
2401 014224  000000                      .WORD   0              ;PRINT TERMINATE
2402 014226  006337  172350          9$: ASL     KPAR4          ;NEXT FLOATING ADDRESS
2403 014232  006337  050516              ASL     FLTPAT         ;NEXT ADDRESS FO RMI
2404 014236  103245                      BCC     1$             ;CONTINUE TEST. ADDRESS 10000000
2405                                                            ;NOT DONE
2406 014240  012737  000006  000004      MOV     #6,4           ;RESTORE TRAP VECTORES
2407 014246  005037  000006              CLR     6
2408 014252  000464                      BR      10$            ;END THE TEST
2409 014254  022626                  3$: CMP     (SP)+,(SP)+    ;TRAP TO HERE IF NO RMI
2410 014256  012737  000006  000004  4$: MOV     #6,4           ;RESTORE VECTORS
2411 014264  005037  000006              CLR     6
2412 014270  005737  001474              TST     $PASS          ;1ST PASS?
2413 014274  001053                      BNE     10$            ;NO
2414 014276  023737  000042  000046      CMP     42,46          ;IS THIS ACT11 QV OR AUTO ACCEPT
2415 014304  001447                      BEQ     10$            ;YES,SKIP TYPEOUT
2416 014306  104401  014314              TYPE    ,65$           ;;TYPE ASCIZ STRING
     014312  000427                      BR      64$            ;;GET OVER THE ASCIZ
                                  ;;65$: .ASCIZ  <CRLF>/RMI REGISTER (G5179) NOT USED-SKIP HI ORDER/
     014372                       64$:
2417 014372  104401  014400              TYPE    ,67$           ;;TYPE ASCIZ STRING
     014376  000412                      BR      66$            ;;GET OVER THE ASCIZ
                                  ;;67$: .ASCIZ  / BIT ADDRESS TEST/<CRLF>
     014424                       66$:
2418 014424  000240                  10$: NOP                    ;END OF TEST
```

```
014426  005237  001472                 INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
2427                                    .SBTTL  TEST # 104 - VERIFY TAG STORE ADDRESS LINES (CA(12:1))
                                        ;;*****************************************************************
                                        ;*TEST 104      VERIFY TAG STORE ADDRESS LINES (CA(12:1))
                                        ;*      VERIFY TAG STORE ADDRESS LINES (CA<12:1>)
                                        ;*PROCEDURE:  WRITE 0 INTO TAGG PARITY STORE ADDRESS LOCATION 0000.
                                        ;*      WRITE BIT PATTERN 000000011 INTO TAG PARITY STORE LOCATION 0001.
                                        ;*      READ TAG PARITY ADDRESS LOCATION 0000 FOR 0'S REPEAT THE ABOVE
                                        ;*      SEQUENCE,EACH TIME CHANGING THE ADDRESS LOCATION THE BIT PATTERN
                                        ;*      IS WRITTEN TO BY SHIFTING THE 1 ONE PLACE TO THE LEFT.
                                        ;;*****************************************************************
     014432                             TST104:
     014432  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     014434  014444                             .WORD   40$             ;TEST START LOCATION
     014436  070032                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     014440  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     014442  070072                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     014444  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     014452  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     014456  014640                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

2428 014460  012737  000002  050516             MOV     #2,FLTPAT       ;1ST FLOATING CACHE DATA STORE ADDRESS PATTERN
2429 014466  012702  040000             2$:     MOV     #40000,R2       ;
2430 014472  012703  060000                     MOV     #60000,R3       ;
2431 014476  063702  050516                     ADD     FLTPAT,R2       ;R2 CONTAINS 40000+FLTPAT
2432 014502  063703  050516                     ADD     FLTPAT,R3       ;R3 CONTAINS 60000+FLTPAT
2433 014506  012713  177777                     MOV     #-1,(R3)        ;ALL 1'S TO MAIN MEM. LOCATION
2434                                                                    ;SPECIFIED BY R3
2435 014512  112737  000002  177750  1$:       MOVB    #HODO,CMR       ;ALLOWS TAG  STORE BIT  TO BE
2436                                                                    ;WRITTEN TO CHR<15:07> ONLY DURING THE
2437                                                                    ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
2438 014520  012737  000015  177746             MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2439 014526  005737  040000                     TST     40000
2440 014532  005737  000000                     TST     0               ;READ UPDATE; WRITE ALL 0'S INTO CACHE
2441                                                                    ;TAG STORE LOCATION 0000.
2442 014536  005712                             TST     (R2)
2443 014540  005713                             TST     (R3)            ;READ UPDATE;WRITE BIT PATTERN 000000011
2444                                                                    ;INTO TAG STORE LOCATION SPECIFIED
2445                                                                    ;BY R3'S BITS 1 THRU 12: CA<12:1>
2446 014542  005737  060000                     TST     60000           ;LOAD TAG STORE LOCATION 0000 INTO CHR
2447 014546  013701  177752                     MOV     CHR,R1          ;SAVE CHR CONTENTS
2448 014552  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     014554  000240                             NOP                     ;FOR  LOOP ON ERROR
2449 014556  105037  177750                     CLRB    CMR             ;DISABLE MAINT. MODE
2450 014562  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
2451 014570  042701  000177                     BIC     #177,R1         ;INTERESTED IN ONLY BITS 15:07
2452 014574  005701                             TST     R1              ;CHECK FOR ALL 0'S
2453 014576  001411                             BEQ     9$              ;PASS
2454 014600  013737  050516  050506             MOV     FLTPAT,CA121    ;SAVE CA<12:1> USED
2455 014606  006237  050506                     ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
2456 014612  104413                             ERROR                   ;ERROR
                                                                        ;-----
     014614  014612                             .WORD   .-2
2457                                                                    ;TAG STORE ADRESS LINE TESTS
```

TEST # 104 - VERIFY TAG STORE ADDRESS LINES (CA(12:1))

```
2458
2459
2460 014616  050506                          CA121                   ;READING CHR<15:07> FOR CACHE TAG STORE
2461                                                                  ;DID NOT RESULT IN ALL 0'S
2462                                                                  ;PRINT CACHE TAG STORE ADDRESS LOCATION
2463                                                                  ;USED: CA<12:1>. NOTE THAT THE 1 IN
                                                                      ;THIS PATTERN WILL POINT TO THE ADDRESS
                                                                      ;LINE THAT POSSIBLY CAUSES ERROR.
2464 014620  000000                          .WORD   0
2465 014622  006337  050516          9$:     ASL     FLTPAT          ;NEXT PATTERN
2466 014626  022737  020000  050516          CMP     #20000,FLTPAT   ;HAS CACHE TAG STORE LOCAT. 4000 BEEN DONE?
2467 014634  001314                          BNE     2$              ;NO
2468 014636  000240                  10$:    NOP                     ;END OF TEST
     014640  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
2473                                    .SBTTL  TEST # 105 - WRITE ALL 0'S INTO  DATA STORE LOCATION 0000
                                        ;;**********************************************************************
                                        ;*TEST 105      WRITE ALL 0'S INTO  DATA STORE LOCATION 0000
                                        ;*      WRITE ALL 0'S INTO  DATA STORE LOCATION 0000.
                                        ;*      READ ALL 0'S FROM CACHE DATA REGISTER.
                                        ;;**********************************************************************
     014644                             TST105:
     014644  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     014646  014656                             .WORD   40$             ;TEST START LOCATION
     014650  070004                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     014652  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     014654  070042                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     014656  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     014664  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     014670  014772                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

2474 014672  005037  060000                     CLR     60000           ;0'S TO MAIN MEMORY LOCATION
2475 014676  112737  000002  177750  1$:       MOVB    #HODO,CMR       ;ALLOWS CACHE DATA STORE BITS TO BE
2476                                                                    ;WRITTEN TO CDR<15:0> ONLY DURING THE
2477                                                                    ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
2478 014704  012737  000015  177746             MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2479 014712  005737  040000                     TST     40000           ;
2480 014716  005737  060000                     TST     60000           ;WRITE ALL 0'S TO  DATA STORE
2481                                                                    ;LOCATION 0000 FROM MAIN MEMORY
2482                                                                    ;LOC. 60000
2483 014722  005737  060000                     TST     60000           ;WRITE  DATA STORE BITS FROM
2484                                                                    ;LOC. 0000 INTO CDR<15:0>.
2485 014726  013737  177754  050502             MOV     CDR,CDR150      ;SAVE CDR CONTENTS
2486 014734  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     014736  000240                             NOP                     ;FOR  LOOP ON ERROR
2487 014740  105037  177750                     CLRB    CMR             ;DISABLE MAINTENANCE
2488 014744  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
2489 014752  005737  050502                     TST     CDR150          ;CHECK FOR 0
2490 014756  001404                             BEQ     10$             ;PASS
2491 014760  104413                             ERROR                   ;ERROR
                                                                        ;-----
     014762  014760                             .WORD   .-2
2492                                                                    ; DATA STORE TESTS
2493                                                                    ;READING CDR<15:0> DID NOT RESULT
2494                                                                    ;IN ALL 0'S
2495 014764  050502                     CDR150  .WORD   0               ;PRINT CDR<15:0> DATA READ.
2496 014766  000000
2497 014770  000240                     10$:    NOP                     ;END OF TEST
     014772  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
2502                                    .SBTTL  TEST # 106 - WRITE ALL 1'S INTO  DATA STORE LOCATION 0000
                                        ;;*****************************************************************
                                        ;*TEST 106      WRITE ALL 1'S INTO  DATA STORE LOCATION 0000
                                        ;*      WRITE ALL 1'S INTO  DATA STORE LOCATION 0000.
                                        ;*      READ ALL 1'S FROM CACHE DATA REGISTER.
                                        ;;*****************************************************************
     014776                             TST106:
     014776  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     015000  015010                             .WORD   40$             ;TEST START LOCATION
     015002  070006                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     015004  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     015006  070044                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     015010  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     015016  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     015022  015130                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

2503 015024  012737  177777  060000          MOV     #-1,60000       ;1'S TO MAIN MEMORY LOCATION
2504 015032  112737  000002  177750  1$:     MOVB    #HODO,CMR       ;ALLOWS CACHE DATA STORE BITS TO BE
2505                                                                    ;WRITTEN TO CDR<15:07> ONLY DURING THE
2506                                                                    ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
2507 015040  012737  000015  177746          MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2508 015046  005737  040000                  TST     40000           ;
2509 015052  005737  060000                  TST     60000           ;WRITE ALL 1'S TO  DATA STORE
2510                                                                    ;LOCATION 0000 FROM MAIN MEMORY
2511                                                                    ;LOC. 60000
2512 015056  005737  060000                  TST     60000           ;WRITE  DATA STORE BITS FROM
2513                                                                    ;LOC. 0000 INTO CDR<15:07>.
2514 015062  013737  177754  050502          MOV     CDR,CDR150      ;SAVE CDR CONTENTS
2515 015070  000240                  25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     015072  000240                          NOP                     ;FOR  LOOP ON ERROR
2516 015074  105037  177750                  CLRB    CMR             ;DISABLE MAINTENANCE
2517 015100  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
2518 015106  022737  177777  050502          CMP     #-1,CDR150      ;CHECK ALL 1'S
2519 015114  001404                          BEQ     10$             ;PASS
2520 015116  104413                          ERROR                   ;ERROR
                                                                        ;-----
     015120  015116                          .WORD   .-2
2521                                                                ; DATA STORE TESTS
2522                                                                ;READING CDR<15:0> DID NOT RESULT
2523                                                                ;IN ALL 1'S
2524 015122  050502                  CDR150                         ;PRINT CDR<15:0> DATA READ.
2525 015124  000000                  .WORD   0
2526 015126  000240                  10$:    NOP                     ;END OF TEST
     015130  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
2531                                    .SBTTL  TEST # 107 - WRITE FLOATING 1 PATRN INTO DATA STORE LOC 0
                                        ;;*****************************************************************
                                        ;*TEST 107      WRITE FLOATING 1 PATRN INTO DATA STORE LOC 0
                                        ;*      WRITE FLOATING 1 PATTERN INTO  DATA STORE LOCATION 0000.
                                        ;*      READ FLOATING 1 PATTERN FROM CACHE DATA REGISTER.
                                        ;;*****************************************************************
      015134                            TST107:
      015134  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      015136  015146                            .WORD   40$             ;TEST START LOCATION
      015140  070014                            .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
      015142  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      015144  070052                            .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
      015146  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
      015154  004437  002452                    JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
      015160  015314                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

2532  015162  012737  000001  050516            MOV     #1,FLTPAT       ;1ST FLOATING 1 PATTERN: 000001
2533  015170  013737  050516  060000  2$:       MOV     FLTPAT,60000    ;FLOATING PATTERN TO MAIN MEMORY
2534  015176  112737  000002  177750  1$:       MOVB    #HODO,CMR       ;ALLOWS CACHE DATA STORE BITS TO BE
2535                                              ;WRITTEN TO CDR<15:07> ONLY DURING THE
2536                                              ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
2537  015204  012737  000015  177746            MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2538  015212  005737  040000                    TST     40000           ;
2539  015216  005737  060000                    TST     60000           ;WRITE FLOATING 1 PATTERN TO  DATA STORE
2540                                              ;LOCATION 0000 FROM MAIN MEMORY
2541                                              ;LOC. 60000
2542  015222  005737  060000                    TST     60000           ;WRITE  DATA STORE BITS FROM
2543                                              ;LOC. 0000 INTO CDR<15:0>.
2544  015226  013737  177754  050502            MOV     CDR,CDR150      ;SAVE CDR CONTENTS
2545  015234  000240                    25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      015236  000240                            NOP                     ;FOR  LOOP ON ERROR
2546  015240  105037  177750                    CLRB    CMR             ;DISABLE MAINTENANCE
2547  015244  012737  001015  177746            MOV     #OFF,CCR        ;DISABLE CACHE
2548  015252  023737  050516  050502            CMP     FLTPAT,CDR150   ;CHECK FOR CORRECT PATTERN
2549  015260  001410                            BEQ     9$              ;PASS
2550  015262  013737  050516  050504            MOV     FLTPAT,EXDAT6   ;SAVE FLOATING PATTERN FOR TYPEOUT
2551  015270  104413                            ERROR                   ;ERROR
                                                                        ;-----
      015272  015270                            .WORD   .-2
2552                                            ; DATA STORE TESTS
2553                                            ;READING CDR<15:0> DID NOT RESULT
2554                                            ;IN CORRECT FLOATING 1 PATTERN
2555  015274  050504                    EXDAT6                          ;PRINT FLOATING PATTERN EXPECTED
2556  015276  050502                    CDR150                          ;PRINT CDR<15:0> DATA READ.
2557  015300  000000                            .WORD   0
2558  015302  006337  050516            9$:     ASL     FLTPAT          ;NEXT PATTERN
2559  015306  103401                            BCS     10$             ;IF PATTERN 100000 HAS BEEN DONE;FINISHED
2560  015310  000727                            BR      2$              ;IF NOT, NEXT PASS
2561  015312  000240                    10$:    NOP                     ;END OF TEST
      015314  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 110 - CLEAR ALL LOW CACHE  DATA STORE LOCATIONS
                                ;;*****************************************************************
                                ;*TEST 110      CLEAR ALL LOW CACHE  DATA STORE LOCATIONS
                                ;*      WRITE ALL 0'S INTO ALL LOW CACHE  DATA STORE LOCATIONS (0000 TO 3777).
                                ;*      READ ALL 0'S EACH CACHE LOCATION FROM CACHE DATA REGISTER.
                                ;;*****************************************************************
                                TST110:
 015320
 015320  000004                         SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                 ;ERROR/LOOP ON TEST
 015322  015332                         .WORD   40$             ;TEST START LOCATION
 015324  070024                         .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
 015326  000000                         .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
 015330  070054                         .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
 015332  012737  001015  177746  40$:   MOV     #OFF,CCR        ;DISABLE CACHE
 015340  004437  002452                 JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
 015344  015512                         .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE

2567 015346  012705  060000             MOV     #60000,R5       ;ADDRESS 60000 INTO R5
2568 015352  005025             5$:     CLR     (R5)+           ;CLEAR MAIN MEMORY LOW CACHE AREA
2569 015354  020527  070000             CMP     R5,#70000       ;FINISHED?
2570 015360  001374                     BNE     5$              ;NO
2571 015362  012705  060000             MOV     #60000,R5       ;START WITH ADDRESS 60000
2572 015366  012703  040000             MOV     #40000,R3       ;ADDRESS 40000 INTO R3
2573 015372  112737  000002  177750 1$:  MOVB    #HODO,CMR       ;ALLOWS CACHE DATA STORE BITS TO BE
2574                                                             ;WRITTEN TO CDR<15:0> ONLY DURING THE
2575                                                             ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
2576 015400  012737  000015  177746         MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2577 015406  005713                     TST     (R3)            ;
2578 015410  005715                     TST     (R5)            ;WRITE ALL 0'S TO DATA STORE FROM MAIN MEM.
2579 015412  005715                     TST     (R5)            ;WRITE DATA STORE BITS INTO CDR<15:0>
2580 015414  013737  177754  050502         MOV     CDR,CDR150      ;SAVE CDR CONTENTS
2581 015422  000240             25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     015424  000240                     NOP                     ;FOR  LOOP ON ERROR
2582 015426  105037  177750             CLRB    CMR             ;DISABLE MAINTENANCE
2583 015432  012737  001015  177746         MOV     #OFF,CCR        ;DISABLE CACHE
2584 015440  022737  000000  050502         CMP     #0,CDR150       ;CHECK ALL 0'S
2585 015446  001411                     BEQ     9$              ;PASS
2586 015450  010537  050466             MOV     R5,CA210+2      ;SAVE ADDRESS USED THIS PASS
2587 015454  005037  050464             CLR     CA210
2588 015460  104413                     ERROR                   ;ERROR
                                                                 ;-----
     015462  015460                     .WORD   .-2
2589                                                             ; DATA STORE TESTS
2590                                                             ;READING CDR<15:0> DID NOT RESULT
2591                                                             ;IN ALL 0'S
2592 015464  050464                     CA210                   ;PRINT CA<21:0> USED
2593 015466  050502                     CDR150                  ;PRINT CDR<15:0> DATA READ.
2594 015470  000000                     .WORD   0
2595 015472  062705  000002     9$:     ADD     #2,R5           ;NEXT CACHE LOCATION
2596 015476  062703  000002             ADD     #2,R3
2597 015502  022705  070000             CMP     #70000,R5       ;HAVE ALL LOW CACHE LOCATIONS BEEN DONE?
2598 015506  001331                     BNE     1$              ;NO
2599 015510  000240             10$:    NOP                     ;END OF TEST
     015512  005237  001472             INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
2604                                    .SBTTL  TEST # 111 - SET ALL LOW CACHE DATA STORE LOCATIONS
                                        ;;*****************************************************************
                                        ;*TEST 111      SET ALL LOW CACHE DATA STORE LOCATIONS
                                        ;*      WRITE ALL 1'S INTO ALL LOW CACHE  DATA STORE LOCATIONS (0000 TO 3777).
                                        ;*      READ ALL 1'S EACH CACHE LOCATION FROM CACHE DATA REGISTER.
                                        ;;*****************************************************************
     015516                             TST111:
     015516  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     015520  015530                             .WORD   40$             ;TEST START LOCATION
     015522  070026                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     015524  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     015526  070056                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     015530  012737  001015  177746     40$:    MOV     #OFF,CCR        ;DISABLE CACHE
     015536  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     015542  015712                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

2605 015544  012705  060000                     MOV     #60000,R5       ;ADDRESS 60000 INTO R5
2606 015550  012725  177777             5$:     MOV     #-1,(R5)+       ;1'S TO MAIN MEMORY LOW CACHE AREA
2607 015554  020527  070000                     CMP     R5,#70000       ;FINISHED?
2608 015560  001373                             BNE     5$              ;NO
2609 015562  012705  060000                     MOV     #60000,R5       ;START WITH ADDRESS 60000
2610 015566  012703  040000                     MOV     #40000,R3       ;ADDRESS 40000 INTO R3
2611 015572  112737  000002  177750     1$:     MOVB    #HODO,CMR       ;ALLOWS CACHE DATA STORE BITS TO BE
2612                                            ;WRITTEN TO CDR<15:0> ONLY DURING THE
2613                                            ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
2614 015600  012737  000015  177746             MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2615 015606  005713                             TST     (R3)            ;
2616 015610  005715                             TST     (R5)            ;WRITE ALL 1'S TO DATA STORE FROM MAIN MEM.
2617 015612  005715                             TST     (R5)            ;WRITE DATA STORE BITS INTO CDR<15:0>
2618 015614  013737  177754  050502             MOV     CDR,CDR150      ;SAVE CDR CONTENTS
2619 015622  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     015624  000240                             NOP                     ;FOR  LOOP ON ERROR
2620 015626  105037  177750                     CLRB    CMR             ;DISABLE MAINTENANCE
2621 015632  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
2622 015640  022737  177777  050502             CMP     #-1,CDR150      ;CHECK ALL 1'S
2623 015646  001411                             BEQ     9$              ;PASS
2624 015650  010537  050466                     MOV     R5,CA210+2      ;SAVE ADDRESS USED THIS PASS
2625 015654  005037  050464                     CLR     CA210
2626 015660  104413                             ERROR                   ;ERROR
                                                                        ;-----
     015662  015660                             .WORD   .-2
2627                                            ; DATA STORE TESTS
2628                                            ;READING CDR<15:0> DID NOT RESULT
2629                                            ;IN ALL 1'S
2630 015664  050464                             CA210                   ;PRINT CA<21:0> USED
2631 015666  050502                             CDR150                  ;PRINT CDR<15:0> DATA READ.
2632 015670  000000                             .WORD   0
2633 015672  062705  000002             9$:     ADD     #2,R5           ;NEXT CACHE LOCATION
2634 015676  062703  000002                     ADD     #2,R3
2635 015702  022705  070000                     CMP     #70000,R5       ;HAVE ALL LOW CACHE LOCATIONS BEEN DONE?
2636 015706  001331                             BNE     1$              ;NO
2637 015710  000240                     10$:    NOP                     ;END OF TEST
     015712  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
2642                                    .SBTTL  TEST # 112 - CLEAR ALL HIGH CACHE DATA STORE LOCATIONS
                                        ;;*****************************************************************
                                        ;*TEST 112      CLEAR ALL HIGH CACHE DATA STORE LOCATIONS
                                        ;*      WRITE ALL 0'S INTO ALL HIGH CACHE  DATA STORE LOCATIONS (4000 TO 7777).
                                        ;*      READ ALL 0'S EACH CACHE LOCATION FROM CACHE DATA REGISTER.
                                        ;;*****************************************************************
     015716                             TST112:
     015716  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     015720  015730                             .WORD   40$             ;TEST START LOCATION
     015722  060024                             .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
     015724  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     015726  060054                             .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
     015730  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     015736  004437  002424                     JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
     015742  016110                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

2643 015744  012705  070000             5$:     MOV     #70000,R5       ;ADDRESS 70000 INTO R5
2644 015750  005025                             CLR     (R5)+           ;CLEAR MAIN MEMORY HI CACHE AREA
2645 015752  020527  100000                     CMP     R5,#100000      ;FINISHED?
2646 015756  001374                             BNE     5$              ;NO
2647 015760  012705  070000                     MOV     #70000,R5       ;START WITH ADDRESS 70000
2648 015764  012703  050000                     MOV     #50000,R3       ;ADDRESS 50000 INTO R3
2649 015770  112737  000002  177750  1$:       MOVB    #HODO,CMR       ;ALLOWS CACHE DATA STORE BITS TO BE
2650                                                                    ;WRITTEN TO CDR<15:0> ONLY DURING THE
2651                                                                    ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
2652 015776  012737  000015  177746             MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2653 016004  005713                             TST     (R3)            ;
2654 016006  005715                             TST     (R5)            ;WRITE ALL 0'S TO DATA STORE FROM MAIN MEM.
2655 016010  005715                             TST     (R5)            ;WRITE DATA STORE BITS INTO CDR<15:0>
2656 016012  013737  177754  050502             MOV     CDR,CDR150      ;SAVE CDR CONTENTS
2657 016020  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     016022  000240                             NOP                     ;FOR  LOOP ON ERROR
2658 016024  105037  177750                     CLRB    CMR             ;DISABLE MAINTENANCE
2659 016030  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
2660 016036  022737  000000  050502             CMP     #0,CDR150       ;CHECK ALL 0'S
2661 016044  001411                             BEQ     9$              ;PASS
2662 016046  010537  050466                     MOV     R5,CA210+2      ;SAVE ADDRESS USED THIS PASS
2663 016052  005037  050464                     CLR     CA210
2664 016056  104413                             ERROR                   ;ERROR
                                                                        ;-----
     016060  016056                             .WORD   .-2
2665                                                                    ; DATA STORE TESTS
2666                                                                    ;READING CDR<15:0> DID NOT RESULT
2667                                                                    ;IN ALL 0'S
2668 016062  050464                             CA210                   ;PRINT CA<21:0> USED
2669 016064  050502                             CDR150                  ;PRINT CDR<15:0> DATA READ.
2670 016066  000000                             .WORD   0
2671 016070  062705  000002             9$:     ADD     #2,R5           ;NEXT CACHE LOCATION
2672 016074  062703  000002                     ADD     #2,R3
2673 016100  022705  100000                     CMP     #100000,R5      ;HAVE ALL HIGH CACHE LOCATIONS BEEN DONE?
2674 016104  001331                             BNE     1$              ;NO
2675 016106  000240                     10$:    NOP                     ;END OF TEST
     016110  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 113 - SET ALL HIGH CACHE DATA STORE LOCATIONS
                                ;;*****************************************************************
                                ;*TEST 113      SET ALL HIGH CACHE DATA STORE LOCATIONS
                                ;*      WRITE ALL 1'S INTO ALL HIGH CACHE  DATA STORE LOCATIONS (4000 TO 7777).
                                ;*      READ ALL 1'S EACH CACHE LOCATION FROM CACHE DATA REGISTER.
                                ;;*****************************************************************
016114                          TST113:
016114  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
016116  016126                        .WORD   40$             ;TEST START LOCATION
016120  060026                        .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
016122  000000                        .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
016124  060056                        .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
016126  012737  001015  177746  40$:  MOV     #OFF,CCR        ;DISABLE CACHE
016134  004437  002424                JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
016140  016310                        .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO LOW CACHE SPACE

2681 016142  012705  070000     5$:    MOV     #70000,R5       ;ADDRESS 70000 INTO R5
2682 016146  012725  177777            MOV     #-1,(R5)+       ;1'S TO MAIN MEMORY HI CACHE AREA
2683 016152  020527  100000            CMP     R5,#100000      ;FINISHED?
2684 016156  001373                    BNE     5$              ;NO
2685 016160  012705  070000            MOV     #70000,R5       ;START WITH ADDRESS 70000
2686 016164  012703  050000            MOV     #50000,R3       ;ADDRESS 50000 INTO R3
2687 016170  112737  000002  177750  1$:    MOVB    #HODO,CMR       ;ALLOWS CACHE DATA STORE BITS TO BE
2688                                                            ;WRITTEN TO CDR<15:0> ONLY DURING THE
2689                                                            ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
2690 016176  012737  000015  177746        MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2691 016204  005713                    TST     (R3)            ;
2692 016206  005715                    TST     (R5)            ;WRITE ALL 1'S TO DATA STORE FROM MAIN MEM.
2693 016210  005715                    TST     (R5)            ;WRITE DATA STORE BITS INTO CDR<15:0>
2694 016212  013737  177754  050502        MOV     CDR,CDR150      ;SAVE CDR CONTENTS
2695 016220  000240              25$:  NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     016222  000240                    NOP                     ;FOR  LOOP ON ERROR
2696 016224  105037  177750            CLRB    CMR             ;DISABLE MAINTENANCE
2697 016230  012737  001015  177746    MOV     #OFF,CCR        ;DISABLE CACHE
2698 016236  022737  177777  050502    CMP     #-1,CDR150      ;CHECK ALL 1'S
2699 016244  001411                    BEQ     9$              ;PASS
2700 016246  010537  050466            MOV     R5,CA210+2      ;SAVE ADDRESS USED THIS PASS
2701 016252  005037  050464            CLR     CA210
2702 016256  104413                    ERROR                   ;ERROR
                                                                ;-----
     016260  016256                    .WORD   .-2
2703                                                            ; DATA STORE TESTS
2704                                                            ;READING CDR<15:0> DID NOT RESULT
2705                                                            ;IN ALL 1'S
2706 016262  050464            CA210                           ;PRINT CA<21:0> USED
2707 016264  050502            CDR150                          ;PRINT CDR<15:0> DATA READ.
2708 016266  000000                    .WORD   0
2709 016270  062705  000002      9$:   ADD     #2,R5           ;NEXT CACHE LOCATION
2710 016274  062703  000002            ADD     #2,R3
2711 016300  022705  100000            CMP     #100000,R5      ;HAVE ALL LOW CACHE LOCATIONS BEEN DONE?
2712 016304  001331                    BNE     1$              ;NO
2713 016306  000240             10$:   NOP                     ;END OF TEST
     016310  005237  001472            INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
2717                                    .SBTTL  TEST # 114 - VERIFY CACHE DATA STORE ADDRESS LINES (CA(12:1))
                                        ;;*****************************************************************
                                        ;*TEST 114      VERIFY CACHE DATA STORE ADDRESS LINES (CA(12:1))
                                        ;*      VERIFY CACHE DATA STORE ADDRESS LINES (CA<12:1>)
                                        ;;*****************************************************************
                                        TST114:
     016314
     016314  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     016316  016326                             .WORD   40$             ;TEST START LOCATION
     016320  070040                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     016322  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     016324  070100                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     016326  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     016334  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     016340  016532                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

2718 016342  000240                             NOP
2719                                                                    ;WHEN THE TEST IS RELOCATED.ADDRESS 70000
2720                                                                    ;WILL BE LOADED WITH ALL 1'S DURING TEST
2721 016344  005037  060000                     CLR     60000           ;ALL 0'S TO MAIN MEMORY
2722 016350  012737  000002  050516             MOV     #2,FLTPAT       ;1ST FLOATING CACHE DATA STORE ADDRESS PATTERN
2723 016356  012702  040000          2$:        MOV     #40000,R2       ;
2724 016362  012703  060000                     MOV     #60000,R3       ;
2725 016366  063702  050516                     ADD     FLTPAT,R2       ;R2 CONTAINS 40000+FLTPAT
2726 016372  063703  050516                     ADD     FLTPAT,R3       ;R3 CONTAINS 60000+FLTPAT
2727 016376  012713  177777                     MOV     #-1,(R3)        ;ALL 1'S TO MAIN MEM. LOCATION
2728                                                                    ;SPECIFIED BY R3
2729 016402  112737  000002  177750  1$:        MOVB    #HODO,CMR       ;ALLOWS CACHE DATA STORE BITS TO BE
2730                                                                    ;WRITTEN TO CDR<15:0> ONLY DURING THE
2731                                                                    ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
2732 016410  012737  000015  177746             MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2733 016416  005737  040000                     TST     40000
2734 016422  005737  060000                     TST     60000           ;WRITE ALL 0'S FROM MAIN MEM. LOCATION
2735                                                                    ;60000 INTO CACHE DATA STORE LOCATION 0000.
2736 016426  005712                             TST     (R2)
2737 016430  005713                             TST     (R3)            ;WRITE ALL 1'S FROM MAIN MEM. INTO
2738                                                                    ;CACHE DATA STORE LOCAT. SPECIFIED
2739                                                                    ;BY R3'S BITS 1 THRU 12: CA<12:1>
2740 016432  005737  060000                     TST     60000           ;LOAD DATA FROM CACHE DATA STORE LOCATION
2741                                                                    ;0000 INTO CDR.
2742 016436  013701  177754                     MOV     CDR,R1          ;SAVE CDR DATA
2743 016442  000240          25$:               NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     016444  000240                             NOP                     ;FOR  LOOP ON ERROR
2744 016446  105037  177750                     CLRB    CMR             ;DISABLE MAINT. MODE
2745 016452  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
2746 016460  005701                             TST     R1              ;CHECK FOR ALL 0'S
2747 016462  001411                             BEQ     9$              ;PASS
2748
2749 016464  013737  050516  050506             MOV     FLTPAT,CA121    ;SAVE CA<12:1> USED
2750 016472  006237  050506                     ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
2751 016476  104413                             ERROR                   ;ERROR
                                                                        ;-----
     016500  016476                             .WORD   .-2
2752                                                                    ;DATA STORE TESTS- ADDRESS LINE VERIFICATION
```

```
2753                                                            ;READING CDR<15:0> FOR CACHE DATA STORE
2754                                                            ;DID NOT RESULT IN ALL 0'S
2755 016502  050506                        CA121               ;PRINT CACHE DATA STORE ADDRESS LOCATION
2756                                                            ;USED: CA<12:1>. NOTE THAT THE 1 IN
2757                                                            ;THIS PATTERN WILL POINT TO THE ADDRESS
2758                                                            ;LINE THAT POSSIBLY CAUSES ERROR.
2759 016504  000000                        .WORD   0
2760 016506  006337  050516          9$:   ASL     FLTPAT      ;NEXT PATTERN
2761 016512  022737  020000  050516        CMP     #20000,FLTPAT ;HAS CACHE DATA STORE LOCAT. 4000 BEEN DONE?
2762 016520  001316                        BNE     2$          ;NO
2763 016522  012737  000240  070000        MOV     #240,70000  ;RESTORE OVERWRITTEN LOCATION 7000 WITH A NOP
2764 016530  000240                  10$:  NOP                 ;END OF TEST
     016532  005237  001472                INC     $TESTN      ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 115 - CHECK EQUAL DATA COMPARISON CONDITION
                                ;;*****************************************************************
                                ;*TEST 115      CHECK EQUAL DATA COMPARISON CONDITION
                                ;*      VERIFY THAT AN EQUAL DATA COMPARISON CONDITION CAN EXIST
                                ;*      BY COMPARING TAG STORE DATA AND CA<21:13>
                                ;*      UNDER THE FOLLOWING CONDITIONS CMR<15:13> SHOULD RESULT IN ALL
                                ;*      1'S INDICATING A MATCH :
                                ;*      TAG STORE DATA AND CA<21:13> ALL 0'S
                                ;;*****************************************************************
016536                          TST115:
016536  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
016540  016550                        .WORD   40$             ;TEST START LOCATION
016542  070000                        .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
016544  000000                        .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
016546  070036                        .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
016550  012737  001015  177746  40$:  MOV     #OFF,CCR        ;DISABLE CACHE
016556  004437  002452                JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
016562  016726                        .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE

2773 016564  112737  000002  177750  1$:   MOVB    #HODO,CMR       ;ALLOWS COMPARED RESULTS TO BE
2774                                                            ;WRITTEN TO CMR<15:13> ONLY DURING
2775                                                            ;THE DESTINATION MEMORY ACCESS
2776                                                            ;OF AN INSTRUCTION
2777 016572  012737  000015  177746        MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2778 016600  005737  040000                TST     40000
2779 016604  005737  000000                TST     0               ;WRITE ALL 0'S INTO TAG STORE LOCATION 0000
2780                                                            ;FROM CACHE ADDRESS CA<21:13>
2781 016610  005737  000000                TST     0               ;PLACE ALL 0'S ON CA<21:13> FOR COMPARISON
2782                                                            ;WITH TAG STORE DATA. WRITE COMPARED
2783                                                            ;RESULTS INDICATION IN CMR<15:13>
2784 016614  013737  177750  050512        MOV     CMR,CM1513      ;SAVE CMR DATA
2785 016622  000240                25$:   NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     016624  000240                       NOP                     ;FOR  LOOP ON ERROR
2786 016626  105037  177750                CLRB    CMR             ;DISABLE MAINTENANCE MODE
2787 016632  012737  001015  177746        MOV     #OFF,CCR        ;DISABLE CACHE
2788 016640  042737  017777  050512        BIC     #17777,CM1513
2789 016646  022737  160000  050512        CMP     #160000,CM1513  ;CHECK THAT CMR<15:13> ALL 1'S
2790 016654  001423                       BEQ     10$             ;PASS
2791 016656  012737  000007  050510        MOV     #7,EXDAT1       ;INDICATE EXPECTED CMR<15:13>
2792 016664  012737  000015  002062        MOV     #13.,LOOP       ;ERROR;PREPARE CM1513. FOR TYPEOUT
2793 016672  006237  050512          2$:   ASR     CM1513
2794 016676  042737  100000  050512        BIC     #100000,CM1513
2795 016704  005337  002062                DEC     LOOP
2796 016710  001370                       BNE     2$
2797 016712  104413                       ERROR                   ;ERROR
                                                                ;-----
     016714  016712                       .WORD   .-2
2798                                                            ;COMPARE TAG STORE & CA<21:13> TESTS
2799                                                            ;BITS 15 THRU 13 OF CMR DID NOT READ
2800                                                            ;AS ALL 1'S
2801 016716  050510                EXDAT1                      ;PRINT CMR<15:13> DATA EXPECTED
2802 016720  050512                CM1513                      ;PRINT CMR<15:13> DATA RECEIVED
2803 016722  000000                .WORD   0
```

TEST # 115 - CHECK EQUAL DATA COMPARISON CONDITION

```
2804 016724  000240                    10$:    NOP                     ;END OF TEST
     016726  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 116 - UNEQUAL DATA COMPARISON CONDITION CAN BE DETECTED

```
2812                                    .SBTTL  TEST # 116 - UNEQUAL DATA COMPARISON CONDITION CAN BE DETECTED
                                        ;;*****************************************************************
                                        ;*TEST 116      UNEQUAL DATA COMPARISON CONDITION CAN BE DETECTED
                                        ;*      VERIFY THAT AN UNEQUAL DATA COMPARISON CONDITION CAN BE DETECTED
                                        ;*      BY COMPARING TAG STORE AND CA<21:13>
                                        ;*      UNDER THE FOLLOWING CONDITIONS FOR TAG STORE DATA AND CA<21:13>
                                        ;*      CMR<15:13> SHOULD READ AS SPECIFIED IN TABLE DEFINED BY TAGS 30$
                                        ;*      TO 38$.
                                        ;;*****************************************************************
      016732                            TST116:
      016732  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      016734  016744                            .WORD   40$             ;TEST START LOCATION
      016736  070036                            .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
      016740  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      016742  070130                            .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
      016744  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
      016752  004437  002452                    JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
      016756  017320                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

2813  016760  000411                    2$:     BR      39$             ;BRANCH OVER TABLE
2814                                    ;               CMR<15:13>      CA<21:13>       TAG STORE
2815                                    ;               ---------       --------        ---------
2816  016762  000006                    30$:    .WORD       6           ;  001              000
2817  016764  000005                    31$:    .WORD       5           ;  002              000
2818  016766  000005                    32$:    .WORD       5           ;  004              000
2819  016770  000005                    33$:    .WORD       5           ;  010              000
2820  016772  000005                    34$:    .WORD       5           ;  020              000
2821  016774  000003                    35$:    .WORD       3           ;  040              000
2822  016776  000003                    36$:    .WORD       3           ;  100              000
2823  017000  000003                    37$:    .WORD       3           ;  200              000
2824  017002  000003                    38$:    .WORD       3           ;  400              000
2825  017004  012737  000200  172350    39$:    MOV     #200,KPAR4      ;KPAR4 CONTAINS THE FLOATING 1 PATTERN
2826                                                                    ;AND REPRESENTS THE THE PAGE ADDRESS FIELD
2827                                                                    ;DATA USED BY MEMORY MNGMNT. TO CONSTRUCT
2828                                                                    ;THE PHYSICAL ADDRESS.  200 IS THE 1ST
2829                                                                    ;FLOATING 1 PATTERN WHICH WILL BE CONSTRUCTED
2830                                                                    ;TO ADDRESS 20000.
2831  017012  012701  016762                    MOV     #30$,R1         ;SAVE ADDRESS OF FIRST CMR<15:13>
2832                                                                    ;EXPECTED DATA
2833  017016  012737  070300  000004    1$:     MOV     #7$-2$+70000,4  ;ALLOW FOR NEX TRAP
2834  017024  012737  000340  000006            MOV     #340,6
2835  017032  112737  000002  177750            MOVB    #HODO,CMR       ;ALLOWS COMPARED RESULTS TO BE WRITTEN
2836                                                                    ;TO CMR<15:13> ONLY DURING THE DESTINATION
2837                                                                    ;MEMORY ACCESS OF AN INSTRUCTION.
2838  017040  012737  000015  177746            MOV     #15,CCR         ;NO UCB SO AS TO WRITE CACHE STORE
2839  017046  012737  000001  177572            MOV     #1,SR0          ;ENABLE MEMORY MNGMNT.
2840  017054  012737  000020  172516            MOV     #20,SR3         ;ENABLE 22-BIT MAPPING
2841  017062  005737  040000                    TST     40000           ;
2842  017066  005737  000000                    TST     0               ;WRITE ALL 0'S TO TAG STORE LOCATION 0000
2843  017072  005737  100000                    TST     100000          ;CHOOSES KPAR4 FOR ADDRESSING. PHYSICAL
2844                                                                    ;ADDRESS WILL BE DETERMINED BY FLOATING
2845                                                                    ;PATTERN USED IN KPAR4.
2846                                                                    ;PLACE DLOATING PATTERN ON CA<21:13>
```

```
                                                                        ;FOR COMPARISON WITH TAG STORE DATA
                                                                        ;AT LOCATION 0000. WRITE THE COMPARED
                                                                        ;RESULT INDICATION INTO CMR<15:13>.
017076  000240                        NOP
017100  000240                        NOP
017102  013737  177750  050512        MOV     CMR,CM1513              ;SAVE CMR DATA
017110  000240              25$:      NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
017112  000240                        NOP                             ;FOR  LOOP ON ERROR
017114  005037  177572                CLR     SR0                     ;DISABLE MEM MNGMENT.
017120  005037  172516                CLR     SR3
017124  012737  001015  177746        MOV     #OFF,CCR                ;DISABLE CACHE
017132  105037  177750                CLRB    CMR                     ;DISABLE MAINTENANCE
017136  012737  000015  002062        MOV     #13.,LOOP               ;PREPARE CM1513.  FOR ERROR CHECK
017144  006237  050512        5$:     ASR     CM1513
017150  042737  100000  050512        BIC     #100000,CM1513
017156  005337  002062                DEC     LOOP
017162  001370                        BNE     5$
017164  023711  050512                CMP     CM1513,(R1)             ;COMPARE CMR<15:13> RECEIVED WITH
                                                                        ;EXPECTED
017170  001426                        BEQ     9$                      ;PASS
017172  013737  172350  050476        MOV     KPAR4,CA2113            ;SAVE PATTERN USED FOR CA<21:13>
017200  012737  000007  002062        MOV     #7,LOOP                 ;PREPARE CA2113 FOR PRINTOUT
017206  006237  050476        6$:     ASR     CA2113
017212  042737  100000  050476        BIC     #100000,CA2113
017220  005337  002062                DEC     LOOP
017224  001370                        BNE     6$
017226  011137  050510                MOV     (R1),EXDAT1             ;PREPARE EXPECTED FOR PRINTOUT
017232  104413                        ERROR                           ;ERROR
                                                                        ;------
017234  017232                        .WORD   .-2
                                                                        ;COMPARE TAG STORE AND CA<21:13> TESTS
                                                                        ;CMR<15:13> DID NOT READ CORRECTLY
017236  050476                        CA2113                          ;PRINT CA<21:13> PATTERN USED ON ADDRESS
                                                                        ;LINES
017240  050510                        EXDAT1                          ;PRINT CMR<15:13> EXPECTED
017242  050512                        CM1513                          ;PRINT CMR<15:13> RECEIVED
017244  000000                        .WORD   0                       ;PRINT TERMINATE
017246  006337  172350        9$:     ASL     KPAR4                   ;NEXT PATTERN;IF PHYSICAL ADDRESS
                                                                        ;10000000 HAS BEEN DONE; FINISHED
017252  103414                        BCS     8$                      ;
017254  005721                        TST     (R1)+                   ;NOT FINISHED; POINT TO NEXT
                                                                        ;CMR<15:13> EXPECTED
017256  000657                        BR      1$                      ;CONTINUE WITH TEST
017260  005037  177572        7$:     CLR     SR0                     ;DISABLE MEM. MNGMNT.
017264  005037  172516                CLR     SR3
017270  105037  177750                CLRB    CMR                     ;DISABLE MAINTENANCE
017274  012737  001015  177746        MOV     #OFF,CCR                ;DISABLE CACHE
017302  022626                        CMP     (SP)+,(SP)+             ;RESTORE STACK DUE TO INTERRUPT
017304  012737  000006  000004  8$:   MOV     #6,4                    ;RESTORE VECTORS
017312  005037  000006                CLR     6                       ;
017316  000240              10$:      NOP                             ;END OF TEST
017320  005237  001472                INC     $TESTN                  ;INCREMENT TEST COUNTER
```

TEST # 117 - TEST FLUSH IN PROGRESS BIT

```
                                        .SBTTL  TEST # 117 - TEST FLUSH IN PROGRESS BIT
                                        ;;*****************************************************************
                                        ;*TEST 117      TEST FLUSH IN PROGRESS BIT
                                        ;*      VERIFY FLUSH IN PROGRESS BIT WILL SET AS A RESULT OF FLUSH
                                        ;;*****************************************************************
017324                                  TST117:
017324  000004                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
017326  017336                                .WORD   40$             ;TEST START LOCATION
017330  017336                                .WORD   1$              ;LOOP ON ERROR START LOCATION
017332  000000                                .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
017334  017372                                .WORD   25$             ;LOOP ON ERROR END LOCATION
017336                                  40$:
2899 017336  005002                    1$:     CLR     R2              ;INITIALIZE COUNTER
2900 017340  005037  002070                    CLR     FAIL1           ;INITIALIZE ERROR FLAG
2901 017344  052737  000400  177746          BIS     #FC,CCR         ;FLUSH CACHE
2902 017352  032737  010000  177746          BIT     #VCIP,CCR       ;VERIFY FLUSH IN PROGRESS
2903 017360  001002                          BNE     3$              ;VCIP BIT IS SET
2904 017362  005237  002070                    INC     FAIL1           ;INDICATE ERROR
2905 017366  005302                    3$:     DEC     R2              ;WAIT DELAY FOR FLUSH TO COMPLETE
2906 017370  001376                          BNE     3$
2907 017372  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
017374  000240                                NOP                     ;FOR  LOOP ON ERROR
2908 017376  005737  002070                    TST     FAIL1           ;IS THERE ERROR
2909 017402  001403                          BEQ     10$             ;PASS
2910 017404  104413                          ERROR                   ;ERROR
                                                                        ;-----
017406  017404                                .WORD   .-2
2911                                                                    ;FLUSH CACHE TESTS
2912                                                                    ;FLUSH IN PROGRESS BIT(VCIP) FAILED
2913                                                                    ;TO SET AS A RESULT OF SETTING CACHE FLUSH BIT
2914 017410  000000                          .WORD   0
2915 017412  000240                    10$:    NOP                     ;END OF TEST
017414  005237  001472                          INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
2919                                    .SBTTL  TEST # 120 - TEST FLUSH IN PROGRESS BIT(VCIP) WILL RESET
                                        ;;*****************************************************************
                                        ;*TEST 120       TEST FLUSH IN PROGRESS BIT(VCIP) WILL RESET
                                        ;*      VERIFY FLUSH IN PROGRESS BIT(VCIP) WILL RESET ON COMPLETION OF FLUSH
                                        ;;*****************************************************************
     017420                             TST120:
     017420  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     017422  017432                             .WORD   40$             ;TEST START LOCATION
     017424  017432                             .WORD   1$              ;LOOP ON ERROR START LOCATION
     017426  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     017430  017456                             .WORD   25$             ;LOOP ON ERROR END LOCATION
     017432                             40$:
2920 017432  005002                     1$:     CLR     R2              ;INITIALIZE COUNTER
2921 017434  052737  000400  177746             BIS     #FC,CCR         ;START FLUSH
2922 017442  032737  010000  177746     3$:     BIT     #VCIP,CCR       ;SEE IF FLUSH COMPLETE
2923 017450  001407                             BEQ     10$             ;FLUSH COMPLETE
2924 017452  005302                             DEC     R2              ;SEE IF TIME HAS RUN OUT
2925 017454  001372                             BNE     3$              ;NOT YET
2926 017456  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     017460  000240                             NOP                     ;FOR  LOOP ON ERROR
2927 017462  104413                             ERROR                   ;ERROR
                                                                         ;-----
     017464  017462                             .WORD   .-2
2928                                                                     ;FLUSH CACHE TESTS
2929                                                                     ;FLUS IN PROGRESS BIT FAILED TO CLEAR
2930                                                                     ;TIME FOR FLUSH TO COMPLETE RAN OUT
2931 017466  000000                             .WORD   0
2932 017470  000240                     10$:    NOP                     ;END OF TEST
     017472  005237  001472                     INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 121 - CHECK THAT VSIU BIT SETS
                                ;;*****************************************************************
                                ;*TEST 121      CHECK THAT VSIU BIT SETS
                                ;*      VERIFY THAT VSIU BIT WILL CHANGE FROM A CLEAR TO SET CONDITION AS
                                ;*      A RESULT OF CACHE FLUSH
                                ;;*****************************************************************
017476                          TST121:
017476  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
017500  017510                          .WORD   40$             ;TEST START LOCATION
017502  017510                          .WORD   1$              ;LOOP ON ERROR START LOCATION
017504  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
017506  017554                          .WORD   25$             ;LOOP ON ERROR END LOCATION
017510                          40$:
2938 017510  032737  020000  177746  1$:     BIT     #VSIU,CCR       ;IS SET A BEING USED
2939 017516  001407                          BEQ     3$              ;YES
2940 017520  052737  000400  177746          BIS     #FC,CCR         ;CAUSE FLUSH FOR SET A
2941 017526  032737  010000  177746  200$:   BIT     #VCIP,CCR       ;WAIT FOR FLUSH TO COMPLETE
2942 017534  001374                          BNE     200$
2943 017536  052737  000400  177746  3$:     BIS     #FC,CCR         ;CAUSE FLUSH
2944 017544  032737  010000  177746  4$:     BIT     #VCIP,CCR       ;WAIT FOR FLUSH TO COMPLETE
2945 017552  001374                          BNE     4$
2946 017554  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     017556  000240                          NOP                     ;FOR  LOOP ON ERROR
2947 017560  032737  020000  177746          BIT     #VSIU,CCR       ;IS VSIU BIT =1 INDICATING VALID SET
2948                                                                 ;B WAS SELECTED
2949 017566  001003                          BNE     10$             ;PASS
2950 017570  104413                          ERROR                   ;ERROR
                                                                     ;-----
     017572  017570                          .WORD   .-2
2951                                                                 ;FLUSH CACHE TESTS
2952                                                                 ;VSIU BIT DID NOT SET AS A RESULT OF FLUSH
2953 017574  000000                          .WORD   0
2954 017576  000240                  10$:    NOP                     ;END OF TEST
     017600  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                        .SBTTL  TEST # 122 - CHECK THAT VSIU BIT CLEARS
                                        ;;*****************************************************************
                                        ;*TEST 122      CHECK THAT VSIU BIT CLEARS
                                        ;*      VERIFY THAT VSIU BIT WILL CHANGE FROM A SET TO CLEAR CONDITION AS
                                        ;*      A RESULT OF CACHE FLUSH
                                        ;;*****************************************************************
 017604
 017604  000004                         TST122: SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
 017606  017616                                 .WORD   40$            ;TEST START LOCATION
 017610  017616                                 .WORD   1$             ;LOOP ON ERROR START LOCATION
 017612  000000                                 .WORD   0              ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
 017614  017662                                 .WORD   25$            ;LOOP ON ERROR END LOCATION
 017616                                 40$:
2960 017616  032737  020000  177746    1$:     BIT     #VSIU,CCR      ;IS SET B BEING USED
2961 017624  001007                             BNE     3$             ;YES
2962 017626  052737  000400  177746            BIS     #FC,CCR        ;CAUSE FLUSH FOR SET B
2963 017634  032737  010000  177746    200$:   BIT     #VCIP,CCR      ;WAIT FOR FLUSH TO COMPLETE
2964 017642  001374                             BNE     200$
2965 017644  052737  000400  177746    3$:     BIS     #FC,CCR        ;CAUSE FLUSH
2966 017652  032737  010000  177746    4$:     BIT     #VCIP,CCR      ;WAIT FOR FLUSH TO COMPLETE
2967 017660  001374                             BNE     4$
2968 017662  000240                    25$:    NOP                    ;INSTRUCTION 'JMP 1$' PLACED HERE
 017664  000240                             NOP                    ;FOR  LOOP ON ERROR
2969 017666  032737  020000  177746            BIT     #VSIU,CCR      ;IS VSIU BIT =0 INDICATING VALID SET
2970                                                                    ;A WAS SELECTED
2971 017674  001403                             BEQ     10$            ;PASS
2972 017676  104413                             ERROR                  ;ERROR
                                                                        ;-----
 017700  017676                                 .WORD   .-2
2973                                                                    ;FLUSH CACHE TESTS
2974                                                                    ;VSIU BIT DID NOT CLEAR AS A RESULT OF FLUSH
2975 017702  000000                             .WORD   0
2976 017704  000240                    10$:    NOP                    ;END OF TEST
 017706  005237  001472                     INC     $TESTN         ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 123 - WRITE AND READ 0'S TO ALL LOW CACHE VALID
                                ;;*****************************************************************
                                ;*TEST 123      WRITE AND READ 0'S TO ALL LOW CACHE VALID
                                ;*      WRITE AND READ 0'S TO ALL LOW CACHE  VALID
                                ;*      BIT STORE ADDRESS LOCATIONS- SET A
                                ;*      (VALID STORE LOCATIONS 0000 TO 3777)
                                ;;*****************************************************************
017712                          TST123:
017712  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
017714  017724                        .WORD   40$             ;TEST START LOCATION
017716  070052                        .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
017720  000000                        .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
017722  070100                        .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
017724  012737  001015  177746  40$:  MOV     #OFF,CCR        ;DISABLE CACHE
017732  004437  002452                JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
017736  020124                        .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE

2983 017740  032737  020000  177746        BIT     #VSIU,CCR       ;IS SET A BEING USED?
2984 017746  001407                BEQ     3$              ;YES
2985 017750  052737  000400  177746        BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET A
2986 017756  032737  010000  177746  200$: BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
2987 017764  001374                BNE     200$
2988 017766  012737  177777  177752  3$:   MOV     #-1,CHR         ;LOAD AMR<21:0> WITH 1'S VIA CHR AND CMR
2989                                                            ;REGISTERS, SINCE TDAR WILL BE USED
2990 017774  112737  000374  177751        MOVB    #374,CMR+1
2991 020002  012705  060000                MOV     #60000,R5       ;;ADDRESS 60000 INTO R5
2992 020006  012703  040000                MOV     #40000,R3       ;ADDRESS 40000 INTO R3
2993 020012  012737  000015  177746  1$:   MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE VALID STORE
2994 020020  112737  000003  177750        MOVB    #HODO+TDAR,CMR  ;HODO ALLOWS VALID STORE  SET A TO
2995                                                            ;BE WRITTEN TO CMR<12> ONLY DURING
2996                                                            ;THE DESTINATION MEMORY ACCESS.
2997                                                            ;TDAR WILL FORCE A 0 TO BE WRITTEN
2998                                                            ;INTO VALID STORE WHEN A WRITE TO
2999                                                            ;VALID STORE OCCURS
3000 020026  005713                TST     (R3)
3001 020030  005715                TST     (R5)            ;WRITE A 0 INTO VALID STORE ADDRESS
3002                                                            ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3003 020032  005715                TST     (R5)            ;WRITE VALID STORE DATA INTO CMR<12>
3004                                                            ;FROM VALID STORE ADDRESS LOCATION
3005                                                            ;JUST WRITTEN INTO.
3006 020034  013701  177750        MOV     CMR,R1          ;SAVE CMR DATA
3007 020040  000240          25$:  NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     020042  000240                NOP                     ;FOR  LOOP ON ERROR
3008 020044  105037  177750        CLRB    CMR             ;DISABLE MAINT. MODE
3009 020050  012737  001015  177746        MOV     #OFF,CCR        ;DISABLE CACHE
3010 020056  032701  010000                BIT     #VLD,R1         ;CMR<12> SHOULD BE 0.
3011 020062  001410                BEQ     9$              ;PASS
3012 020064  010537  050506                MOV     R5,CA121        ;SAVE VALID STORE ADDRESS LOCATION
3013                                                            ;USED: CA<12:1>
3014 020070  006237  050506                ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
3015 020074  104413                ERROR                   ;ERROR
                                                                ;-----
     020076  020074                .WORD   .-2
```

```
3016                                                    ;VALID BITS STORE TESTS
3017                                                    ;READING VALID STORE DATA SET A
3018                                                    ;THRU CMR<12> DID NOT RESULT IN 0.
3019 020100  050506                    CA121           ;PRINT VALID STORE ADDRESS LOCATION
3020                                                    ;USED: CA<12:1>.
3021 020102  000000                    .WORD   0
3022 020104  062705  000002    9$:     ADD     #2,R5   ;NEXT VALID STORE LOCATION
3023 020110  062703  000002            ADD     #2,R3
3024 020114  020527  070000            CMP     R5,#70000       ;HAVE ALL LOW CACHE ADDRESS LOCATIONS BEEN DONE?
3025 020120  001334                    BNE     1$              ;NO
3026 020122  000240            10$:    NOP                     ;END OF TEST
     020124  005237  001472            INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 124 - WRITE AND READ 1'S TO ALL LOW CACHE VALID
                                ;;*****************************************************************
                                ;*TEST 124      WRITE AND READ 1'S TO ALL LOW CACHE VALID
                                ;*      WRITE AND READ 1'S TO ALL LOW CACHE  VALID
                                ;*      BIT STORE ADDRESS LOCATIONS- SET A
                                ;*      (VALID STORE LOCATIONS 0000 TO 3777)
                                ;;*****************************************************************
     020130                     TST124:
     020130  000004                     SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
     020132  020142                     .WORD   40$             ;TEST START LOCATION
     020134  020206                     .WORD   1$              ;LOOP ON ERROR START LOCATION
     020136  000000                     .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     020140  020234                     .WORD   25$             ;LOOP ON ERROR END LOCATION
     020142                     40$:
     020142  012737  000124  001472     MOV     #124,$TESTN     ;;SET TEST NUMBER IN APT MAIL BOX
3033 020150  032737  020000  177746     BIT     #VSIU,CCR       ;IS SET A BEING USED?
3034 020156  001407                     BEQ     3$              ;YES
3035 020160  052737  000400  177746     BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET A
3036 020166  032737  010000  177746 200$: BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3037 020174  001374                     BNE     200$
3038 020176  012705  060000         3$: MOV     #60000,R5       ;;ADDRESS 60000 INTO R5
3039 020202  012703  040000             MOV     #40000,R3       ;ADDRESS 40000 INTO R3
3040 020206  012737  000015  177746 1$: MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3041 020214  112737  000002  177750     MOVB    #HODO,CMR       ;HODO ALLOWS VALID STORE  SET A TO
3042                                                            ;BE WRITTEN TO CMR<12> ONLY DURING
3043                                                            ;THE DESTINATION MEMORY ACCESS.
3044 020222  005713                     TST     (R3)
3045 020224  005715                     TST     (R5)            ;WRITE A 1 INTO VALID STORE ADDRESS
3046                                                            ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3047 020226  005715                     TST     (R5)            ;WRITE VALID STORE DATA INTO CMR<12>
3048                                                            ;FROM VALID STORE ADDRESS LOCATION
3049                                                            ;JUST WRITTEN INTO.
3050 020230  013701  177750             MOV     CMR,R1          ;SAVE CMR DATA
3051 020234  000240                 25$: NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     020236  000240                     NOP                     ;FOR  LOOP ON ERRCR
3052 020240  105037  177750             CLRB    CMR             ;DISABLE MAINT. MODE
3053 020244  012737  001015  177746     MOV     #OFF,CCR        ;DISABLE CACHE
3054 020252  032701  010000             BIT     #VLD,R1         ;CMR<12> SHOULD BE 1.
3055 020256  001010                     BNE     9$              ;PASS
3056
3057 020260  010537  050506             MOV     R5,CA121        ;SAVE VALID STORE ADDRESS LOCATION
3058                                                            ;USED: CA<12:1>
3059 020264  006237  050506             ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
3060 020270  104413                     ERROR                   ;ERROR
                                                                ;-----
     020272  020270                     .WORD   .-2
3061                                                            ;VALID BITS STORE TESTS
3062                                                            ;READING VALID STORE DATA SET A
3063                                                            ;THRU CMR<12> DID NOT RESULT IN 1.
3064 020274  050506                     CA121                   ;PRINT VALID STORE ADDRESS LOCATION
3065                                                            ;USED: CA<12:1>.
3066 020276  000000                     .WORD   0
3067 020300  062705  000002         9$: ADD     #2,R5           ;NEXT VALID STORE LOCATION
3068 020304  062703  000002             ADD     #2,R3
3069 020310  020527  070000             CMP     R5,#70000       ;HAVE ALL LOW CACHE ADDRESS LOCATIONS BEEN DONE?
3070 020314  001334                     BNE     1$              ;NO
```

```
 3071 020316  000240                  10$:   NOP                    ;END OF TEST
      020320  005237  001472                 INC    $TESTN          ;INCREMENT TEST COUNTER
```

```
                                        .SBTTL  TEST # 125 - WRITE AND READ 0'S TO ALL HIGH CACHE VALID
                                        ;;*****************************************************************
                                        ;*TEST 125      WRITE AND READ 0'S TO ALL HIGH CACHE VALID
                                        ;*      WRITE AND READ 0'S TO ALL HIGH CACHE  VALID
                                        ;*      BIT STORE ADDRESS LOCATIONS- SET A
                                        ;*      (VALID STORE LOCATIONS 4000 TO 7777)
                                        ;;*****************************************************************
                                        TST125:
 020324
 020324  000004                                 SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
 020326  020336                                 .WORD   40$             ;TEST START LOCATION
 020330  060052                                 .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
 020332  000000                                 .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
 020334  060100                                 .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
 020336  012737  001015  177746  40$:    MOV     #OFF,CCR                ;DISABLE CACHE
 020344  004437  002424                  JSR     R4,RELCTL               ;LOCATE TEST CODE TO LOW CACHE SPACE
 020350  020536                          .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

3078 020352  032737  020000  177746          BIT     #VSIU,CCR               ;IS SET A BEING USED?
3079 020360  001407                          BEQ     3$                      ;YES
3080 020362  052737  000400  177746          BIS     #FC,CCR                 ;NO; FLUSH CACHE FOR SET A
3081 020370  032737  010000  177746  200$:   BIT     #VCIP,CCR               ;WAIT TILL FLUSH COMPLETE
3082 020376  001374                          BNE     200$
3083 020400  012737  177777  177752  3$:     MOV     #-1,CHR                 ;LOAD AMR<21:0> WITH 1'S VIA CHR AND CMR
3084                                                                         ;REGISTERS, SINCE TDAR WILL BE USED
3085 020406  112737  000374  177751          MOVB    #374,CMR+1
3086 020414  012705  070000                  MOV     #70000,R5               ;;ADDRESS 70000 INTO R5
3087 020420  012703  050000                  MOV     #50000,R3               ;ADDRESS 50000 INTO R3
3088 020424  012737  000015  177746  1$:     MOV     #15,CCR                 ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3089 020432  112737  000003  177750          MOVB    #HODO+TDAR,CMR          ;HODO ALLOWS VALID STORE  SET A TO
3090                                                                         ;BE WRITTEN TO CMR<12> ONLY DURING
3091                                                                         ;THE DESTINATION MEMORY ACCESS.
3092                                                                         ;TDAR WILL FORCE A 0 TO BE WRITTEN
3093                                                                         ;INTO VALID STORE WHEN A WRITE TO
3094                                                                         ;VALID STORE OCCURS
3095 020440  005713                          TST     (R3)
3096 020442  005715                          TST     (R5)                    ;WRITE A 0 INTO VALID STORE ADDRESS
3097                                                                         ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3098 020444  005715                          TST     (R5)                    ;WRITE VALID STORE DATA INTO CMR<12>
3099                                                                         ;FROM VALID STORE ADDRESS LOCATION
3100                                                                         ;JUST WRITTEN INTO.
3101 020446  013701  177750                  MOV     CMR,R1                  ;SAVE CMR DATA
3102 020452  000240                  25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
 020454  000240                          NOP                             ;FOR  LOOP ON ERROR
3103 020456  105037  177750                  CLRB    CMR                     ;DISABLE MAINT. MODE
3104 020462  012737  001015  177746          MOV     #OFF,CCR                ;DISABLE CACHE
3105 020470  032701  010000                  BIT     #VLD,R1                 ;CMR<12> SHOULD BE 0.
3106 020474  001410                          BEQ     9$                      ;PASS
3107 020476  010537  050506                  MOV     R5,CA121                ;SAVE VALID STORE ADDRESS LOCATION
3108                                                                         ;USED: CA<12:1>
3109 020502  006237  050506                  ASR     CA121                   ;PREPARE CA121 FOR TYPEOUT
3110 020506  104413                          ERROR                           ;ERROR
                                                                             ;-----
 020510  020506                          .WORD   .-2
```

```
3111                                                    ;VALID BITS STORE TESTS
3112                                                    ;READING VALID STORE DATA SET A
3113                                                    ;THRU CMR<12> DID NOT RESULT IN 0.
3114 020512  050506                    CA121           ;PRINT VALID STORE ADDRESS LOCATION
3115                                                    ;USED: CA<12:1>.
3116 020514  000000                    .WORD   0
3117 020516  062705  000002    9$:     ADD     #2,R5   ;NEXT VALID STORE LOCATION
3118 020522  062703  000002            ADD     #2,R3
3119 020526  020527  100000            CMP     R5,#100000      ;HAVE ALL HIGH CACHE ADDRESS LOCATIONS BEEN DONE?
3120 020532  001334                    BNE     1$              ;NO
3121 020534  000240            10$:    NOP                     ;END OF TEST
     020536  005237  001472            INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
3127                                    .SBTTL  TEST # 126 - WRITE AND READ 1'S TO ALL HIGH CACHE VALID
                                        ;;*****************************************************************
                                        ;*TEST 126      WRITE AND READ 1'S TO ALL HIGH CACHE VALID
                                        ;*      WRITE AND READ 1'S TO ALL HIGH CACHE  VALID
                                        ;*      BIT STORE ADDRESS LOCATIONS- SET A
                                        ;*      (VALID STORE LOCATIONS 4000 TO 7777)
                                        ;;*****************************************************************
     020542                             TST126:
     020542  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     020544  020554                             .WORD   40$             ;TEST START LOCATION
     020546  060036                             .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
     020550  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     020552  060064                             .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
     020554  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     020562  004437  002424                     JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
     020566  020740                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

3128 020570  032737  020000  177746             BIT     #VSIU,CCR       ;IS SET A BEING USED?
3129 020576  001407                             BEQ     3$              ;YES
3130 020600  052737  000400  177746             BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET A
3131 020606  032737  010000  177746  200$:      BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3132 020614  001374                             BNE     200$
3133 020616  012705  070000          3$:        MOV     #70000,R5       ;;ADDRESS 70000 INTO R5
3134 020622  012703  050000                     MOV     #50000,R3       ;ADDRESS 50000 INTO R3
3135 020626  012737  000015  177746  1$:        MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3136 020634  112737  000002  177750             MOVB    #HODO,CMR       ;HODO ALLOWS VALID STORE  SET A TO
3137                                                                    ;BE WRITTEN TO CMR<12> ONLY DURING
3138                                                                    ;THE DESTINATION MEMORY ACCESS.
3139 020642  005713                             TST     (R3)
3140 020644  005715                             TST     (R5)            ;WRITE A 1 INTO VALID STORE ADDRESS
3141                                                                    ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3142 020646  005715                             TST     (R5)            ;WRITE VALID STORE DATA INTO CMR<12>
3143                                                                    ;FROM VALID STORE ADDRESS LOCATION
3144                                                                    ;JUST WRITTEN INTO.
3145 020650  013701  177750                     MOV     CMR,R1          ;SAVE CMR DATA
3146 020654  000240                  25$:       NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     020656  000240                             NOP                     ;FOR  LOOP ON ERROR
3147 020660  105037  177750                     CLRB    CMR             ;DISABLE MAINT. MODE
3148 020664  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
3149 020672  032701  010000                     BIT     #VLD,R1         ;CMR<12> SHOULD BE 1.
3150 020676  001010                             BNE     9$              ;PASS
3151 020700  010537  050506                     MOV     R5,CA121        ;SAVE VALID STORE ADDRESS LOCATION
3152                                                                    ;USED: CA<12:1>
3153 020704  006237  050506                     ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
3154 020710  104413                             ERROR                   ;ERROR
                                                                        ;-----
     020712  020710                             .WORD   .-2
3155                                                                    ;VALID BITS STORE TESTS
3156                                                                    ;READING VALID STORE DATA SET A
3157                                                                    ;THRU CMR<12> DID NOT RESULT IN 0.
3158 020714  050506                             CA121                   ;PRINT VALID STORE ADDRESS LOCATION
3159                                                                    ;USED: CA<12:1>.
3160 020716  000000                             .WORD   0
```

TEST # 126 - WRITE AND READ 1'S TO ALL HIGH CACHE VALID

```
3161 020720  062705  000002          9$:     ADD     #2,R5           ;NEXT VALID STORE LOCATION
3162 020724  062703  000002                  ADD     #2,R3
3163 020730  020527  100000                  CMP     R5,#100000      ;HAVE ALL HIGH CACHE ADDRESS LOCATIONS BEEN DONE?
3164 020734  001334                         BNE     1$              ;NO
3165 020736  000240                  10$:    NOP                     ;END OF TEST
     020740  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
3169                                    .SBTTL  TEST # 127 - VERIFY VALID DATA STORE ADRS LINES (CA(12:1))
                                        ;;*****************************************************************
                                        ;*TEST 127      VERIFY VALID DATA STORE ADRS LINES (CA(12:1))
                                        ;*       VERIFY VALID DATA STORE ADDRESS LINES (CA<12:1>)
                                        ;;*****************************************************************
        020744                          TST127:
        020744  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
        020746  020756                  .WORD   40$                     ;TEST START LOCATION
        020750  070054                  .WORD   1$-40$+67764            ;LOOP ON ERROR START LOCATION
        020752  000000                  .WORD   0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
        020754  070130                  .WORD   25$-40$+67764           ;LOOP ON ERROR END LOCATION
        020756  012737  001015  177746  40$:    MOV     #OFF,CCR        ;DISABLE CACHE
        020764  004437  002452                  JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
        020770  021206                  .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

3170 C20772  032737  020000  177746          BIT     #VSIU,CCR       ;IS SET A BEING USED?
3171 021000  001407                  BEQ     3$                      ;YES
3172 021002  052737  000400  177746          BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET A
3173 021010  032737  010000  177746  4$:     BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3174 021016  001374                  BNE     4$
3175 021020  012737  000002  050516  3$:     MOV     #2,FLTPAT       ;1ST FLOATING CACHE DATA STORE ADDRESS PATTERN
3176 021026  012702  040000          2$:     MOV     #40000,R2       ;
3177 021032  012703  060000                  MOV     #60000,R3       ;
3178 021036  063702  050516                  ADD     FLTPAT,R2       ;R2 CONTAINS 40000+FLTPAT
3179 021042  063703  050516                  ADD     FLTPAT,R3       ;R3 CONTAINS 60000+FLTPAT
3180 021046  112737  000002  177750  1$:     MOVB    #HODO,CMR       ;HODO ALLOWS VALID DATA STORE BITS TO BE
3181                                                                  ;WRITTEN TO CMR<12> ONLY DURING THE
3182                                                                  ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
3183 021054  012737  000015  177746          MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3184 021062  152737  000001  177750          BISB    #TDAR,CMR       ;TDAR WILL FORCE A 0 TO BE WRITTEN
3185                                                                  ;INTO VALID STORE WHEN A WRITE TO
3186                                                                  ;VALID STORE OCCURS.
3187 021070  005737  040000                  TST     40000
3188 021074  005737  060000                  TST     60000           ;WRITE 0 INTO VALID STORE LOCATION 0000.
3189 021100  142737  000001  177750          BICB    #TDAR,CMR       ;CLEARING TDAR WILL ALLOW A 1 TO BE
3190                                                                  ;WRITTEN INTO VALID STORE WHEN A WRITE
3191                                                                  ;TO VALID STORE OCCURS.
3192 021106  005712                  TST     (R2)
3193 021110  005713                  TST     (R3)                    ;WRITE 1 INTO VALID STORE LOCATION
3194                                                                  ;SPECIFIED BY R3'S BITS 1 THRU 12:CA<12:1>.
3195 021112  005737  060000                  TST     60000           ;LOAD DATA FROM VALID DATA STORE LOCATION
3196                                                                  ;0000 INTO CMR<12>.
3197 021116  013701  177750                  MOV     CMR,R1          ;SAVE CMR DATA
3198 021122  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     021124  000240                          NOP                     ;FOR  LOOP ON ERROR
3199 021126  105037  177750                  CLRB    CMR             ;DISABLE MAINT. MODE
3200 021132  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
3201 021140  032701  010000                  BIT     #VLD,R1         ;CMR<12> SHOULD READ 0.
3202 021144  001411                  BEQ     9$                      ;PASS
3203                                                          ;ROUTINE
3204 021146  013737  050516  050506          MOV     FLTPAT,CA121    ;SAVE CA<12:1> USED
3205 021154  006237  050506                  ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
3206 021160  104413                          ERROR                   ;ERROR
```

TEST # 127 - VERIFY VALID DATA STORE ADRS LINES (CA(12:1))

```
                                                                    ;-----
      021162  021160                          .WORD   .-2
                                                                    ;VALID STOR ADDRESS VERIFICATION.
                                                                    ;VALID STORE LOCATION 0000 DID NOT
                                                                    ;READ AS A 0 INDICATING THAT IT WAS
                                                                    ;OVERWRITTEN WITH A 1. THIS SUGGESTS
                                                                    ;A BAD CA<12:1> VALID STORE ADDRESS LINE.
      021164  050506                          CA121                 ;PRINT VALID STORE ADDRESS FAILURE: CA<12:1>.
                                                                    ;NOTE THAT THE 1 IN THIS PATTERN
                                                                    ;WILL POINT TO THE ADDRESS LINE OF
                                                                    ;THAT BROUGHT OUT ERROR.
      021166  000000                          .WORD   0
      021170  006337  050516          9$:     ASL     FLTPAT        ;NEXT PATTERN
      021174  022737  020000  050516          CMP     #20000,FLTPAT ;HAS VALID DATA STORE  ADDRESS 4000 BEEN DONE?
      021202  001311                          BNE     2$            ;NO
      021204  000240                  10$:    NOP                   ;END OF TEST
      021206  005237  001472                  INC     $TESTN        ;INCREMENT TEST COUNTER
```

```
3226                                    .SBTTL  TEST # 130 - LOW CACHE INVALIDATE WITH CACHE FLUSH
                                        ;;*****************************************************************
                                        ;*TEST 130      LOW CACHE INVALIDATE WITH CACHE FLUSH
                                        ;*      VERIFY THAT ALL LOW CACHE VALID STORE SET A ADDRESS LOCATIONS
                                        ;*      WILL BE INVALIDATED AS A RESULT OF A CACHE FLUSH.
                                        ;*      (FLUSH COUNTER ADDRESS LOCATIONS [CNT<12:1>]: 0000-3777)
                                        ;;*****************************************************************
     021212                             TST130:
     021212  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     021214  021224                             .WORD   40$             ;TEST START LOCATION
     021216  070074                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     021220  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     021222  070130                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     021224  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     021232  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     021236  021464                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

3227 021240  012705  060000                     MOV     #60000,R5       ;;ADDRESS 60000 INTO R5
3228 021244  012703  040000                     MOV     #40000,R3       ;ADDRESS 40000 INTO R3
3229 021250  032737  020000  177746             BIT     #VSIU,CCR       ;IS SET A BEING USED?
3230 021256  001407                             BEQ     3$              ;YES
3231 021260  052737  000400  177746             BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET A
3232 021266  032737  010000  177746  200$:      BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3233 021274  001374                             BNE     200$
3234 021276  012737  000015  177746  3$:        MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3235 021304  112737  000002  177750             MOVB    #HODO,CMR       ;HODO ALLOWS VALID STORE  SET A TO
3236                                                                    ;BE WRITTEN TO CMR<12> ONLY DURING
3237                                                                    ;THE DESTINATION MEMORY ACCESS.
3238 021312  005713                     4$:     TST     (R3)
3239 021314  005715                             TST     (R5)            ;WRITE A 1 INTO VALID STORE ADDRESS
3240                                                                    ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3241 021316  062705  000002                     ADD     #2,R5           ;NEXT VALID STORE LOCATION
3242 021322  062703  000002                     ADD     #2,R3
3243 021326  020527  070000                     CMP     R5,#70000       ;HAVE ALL LOW CACHE LOCATIONS BEEN DONE?
3244 021332  001367                             BNE     4$              ;NO
3245 021334  052737  000400  177746  1$:        BIS     #FC,CCR         ;FLUSH CACHE TO SELECT SET B AND
3246                                                                    ;INVALIDATE SET A
3247 021342  032737  010000  177746  500$:      BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3248 021350  001374                             BNE     500$
3249 021352  052737  000400  177746             BIS     #FC,CCR         ;FLUSH TO SELECT SET A AGAIN
3250 021360  032737  010000  177746  6$:        BIT     #VCIP,CCR       ;WAIT
3251 021366  001374                             BNE     6$
3252 021370  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     021372  000240                             NOP                     ;FOR  LOOP ON ERROR
3253 021374  012705  060000                     MOV     #60000,R5       ;ADDRESS 60000 INTO R5
3254 021400  005715                     2$:     TST     (R5)            ;WRITE VALID STORE DATA INTO CMR<12>
3255                                                                    ;FROM ADDRESS LOCATION SPECIFIED BY
3256                                                                    ;R5'S BITS 12-1.
3257 021402  013701  177750                     MOV     CMR,R1          ;SAVE CMR DATA
3258 021406  032701  010000                     BIT     #VLD,R1         ;CMR<12> SHOULD BE 0
3259 021412  001416                             BEQ     9$              ;PASS
3260 021414  105037  177750                     CLRB    CMR             ;DISABLE MAINT. MODE
3261 021420  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
```

TEST # 130 - LOW CACHE INVALIDATE WITH CACHE FLUSH

```
3262 021426  010537  050514              MOV     R5,CNT121       ;SAVE VALID STORE FLUSH ADDRESS LOCATION
3263                                                              ;USED: CNT<12:1>
3264 021432  006237  050514              ASR     CNT121          ;PREPARE CNT121 FOR TYPEOUT
3265 021436  104413                      ERROR                   ;ERROR
                                                                  ;-----
     021440  021436                      .WORD   .-2
3266                                                              ;FLUSH CACHE INVALID TEST-SET A
3267                                                              ;READING VALID STORE LOCATION FROM SET A THRU CMR<12>
3268                                                              ;DID NOT RESULT IN A ZERO,INDICATING THAT
3269                                                              ;THE CACHE FLUSH DID NOT INVALIDATE THIS
3270                                                              ; LOCATION.
3271 021442  050514                      CNT121                  ;PRINT VALID STORE FLUSH ADDRESS LOCATION
3272                                                              ;IN ERROR: CNT<12:1>.
3273 021444  000000                      .WORD   0
3274 021446  000405                      BR      10$             ;IF ERROR, END TEST
3275 021450  062705  000002      9$:     ADD     #2,R5           ;NEXT VALID STORE LOCATION
3276 021454  020527  070000              CMP     R5,#70000       ;HAVE ALL LOW CACHE ADDRESS LOCATIONS BEEN DONE?
3277 021460  001347                      BNE     2$              ;NO
3278 021462  000240              10$:    NOP                     ;END OF TEST
     021464  005237  001472              INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
3284                                    .SBTTL  TEST # 131 - HIGH CACHE INVALIDATE WITH CACHE FLUSH
                                        ;;*****************************************************************
                                        ;*TEST 131      HIGH CACHE INVALIDATE WITH CACHE FLUSH
                                        ;*      VERIFY THAT ALL HI CACHE VALID STORE SET A ADDRESS LOCATIONS
                                        ;*      WILL BE INVALIDATED AS A RESULT OF A CACHE FLUSH.
                                        ;*      (FLUSH COUNTER ADDRESS LOCATIONS [CNT<12:1>]: 4000-7777)
                                        ;;*****************************************************************
     021470                             TST131:
     021470  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     021472  021502                             .WORD   40$             ;TEST START LOCATION
     021474  060074                             .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
     021476  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     021500  060130                             .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
     021502  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     021510  004437  002424                     JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
     021514  021742                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

3285 021516  012705  070000                     MOV     #70000,R5       ;;ADDRESS 70000 INTO R5
3286 021522  012703  050000                     MOV     #50000,R3       ;ADDRESS 50000 INTO R3
3287 021526  032737  020000  177746             BIT     #VSIU,CCR       ;IS SET A BEING USED?
3288 021534  001407                            BEQ     3$              ;YES
3289 021536  052737  000400  177746             BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET A
3290 021544  032737  010000  177746  200$:      BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3291 021552  001374                            BNE     200$
3292 021554  012737  000015  177746  3$:        MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3293 021562  112737  000002  177750             MOVB    #HODO,CMR       ;HODO ALLOWS VALID STORE  SET A TO
3294                                            ;BE WRITTEN TO CMR<12> ONLY DURING
3295                                            ;THE DESTINATION MEMORY ACCESS.
3296 021570  005713                    4$:     TST     (R3)
3297 021572  005715                            TST     (R5)            ;WRITE A 1 INTO VALID STORE ADDRESS
3298                                            ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3299 021574  062705  000002                     ADD     #2,R5           ;NEXT VALID STORE LOCATION
3300 021600  062703  000002                     ADD     #2,R3
3301 021604  020527  100000                     CMP     R5,#100000      ;HAVE ALL HI CACHE LOCATIONS BEEN DONE?
3302 021610  001367                            BNE     4$              ;NO
3303 021612  052737  000400  177746  1$:        BIS     #FC,CCR         ;FLUSH CACHE TO SELECT SET B AND
3304                                            ;INVALIDATE SET A
3305 021620  032737  010000  177746  500$:      BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3306 021626  001374                            BNE     500$
3307 021630  052737  000400  177746             BIS     #FC,CCR         ;FLUSH TO SELECT SET A AGAIN
3308 021636  032737  010000  177746  6$:        BIT     #VCIP,CCR       ;WAIT
3309 021644  001374                            BNE     6$
3310 021646  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     021650  000240                            NOP                     ;FOR  LOOP ON ERROR
3311 021652  012705  070000                     MOV     #70000,R5       ;ADDRESS 70000 INTO R5
3312 021656  005715                    2$:     TST     (R5)            ;WRITE VALID STORE DATA INTO CMR<12>
3313                                            ;FROM ADDRESS LOCATION SPECIFIED BY
3314                                            ;R5'S BITS 12-1.
3315 021660  013701  177750                     MOV     CMR,R1          ;SAVE CMR DATA
3316 021664  032701  010000                     BIT     #VLD,R1         ;CMR<12> SHOULD BE 0
3317 021670  001416                            BEQ     9$              ;PASS
3318 021672  105037  177750                     CLRB    CMR             ;DISABLE MAINT. MODE
3319 021676  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
```

TEST # 131 - HIGH CACHE INVALIDATE WITH CACHE FLUSH

```
3320 021704  010537  050514                MOV     R5,CNT121       ;SAVE VALID STORE FLUSH ADDRESS LOCATION
3321                                                                 ;USED: CNT<12:1>
3322 021710  006237  050514                ASR     CNT121          ;PREPARE CNT121 FOR TYPEOUT
3323 021714  104413                        ERROR                   ;ERROR
                                                                     ;-----
     021716  021714                        .WORD   .-2
3324                                                                 ;FLUSH CACHE TEST-SET A
3325                                                                 ;READING VALID STORE LOCATION FROM SET A THRU CMR<12>
3326                                                                 ;DID NOT RESULT IN A ZERO,INDICATING THAT
3327                                                                 ;THE CACHE FLUSH DID NOT INVALIDATE THIS
3328                                                                 ; LOCATION.
3329 021720  050514                        CNT121                  ;PRINT VALID STORE FLUSH ADDRESS LOCATION
3330                                                                 ;IN ERROR: CNT<12:1>.
3331 021722  000000                        .WORD   0
3332 021724  000405                        BR      10$             ;IF ERROR, END TEST
3333 021726  062705  000002          9$:   ADD     #2,R5           ;NEXT VALID STORE LOCATION
3334 021732  020527  100000                CMP     R5,#100000      ;HAVE ALL HI CACHE ADDRESS LOCATIONS BEEN DONE?
3335 021736  001347                        BNE     2$              ;NO
3336 021740  000240                10$:   NOP                     ;END OF TEST
     021742  005237  001472                INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 132 - WRITE AND READ 0'S TO ALL LOW CACHE VALID
                                ;;*********************************************************************
                                ;*TEST 132      WRITE AND READ 0'S TO ALL LOW CACHE VALID
                                ;*       WRITE AND READ 0'S TO ALL LOW CACHE  VALID
                                ;*       BIT STORE ADDRESS LOCATIONS- SET B
                                ;*       (VALID STORE LOCATIONS 0000 TO 3777)
                                ;;*********************************************************************
                                TST132:
021746
021746  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
021750  021760                          .WORD   40$             ;TEST START LOCATION
021752  070052                          .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
021754  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
021756  070100                          .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
021760  012737  001015  177746  40$:    MOV     #OFF,CCR        ;DISABLE CACHE
021766  004437  002452                  JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
021772  022160                          .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE

3343 021774  032737  020000  177746          BIT     #VSIU,CCR       ;IS SET B BEING USED?
3344 022002  001007                          BNE     3$              ;YES
3345 022004  052737  000400  177746          BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET B
3346 022012  032737  010000  177746  200$:   BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3347 022020  001374                          BNE     200$
3348 022022  012737  177777  177752  3$:     MOV     #-1,CHR         ;LOAD AMR<21:0> WITH 1'S VIA CHR AND CMR
3349                                                                 ;REGISTERS, SINCE TDAR WILL BE USED
3350 022030  112737  000374  177751          MOVB    #374,CMR+1
3351 022036  012705  060000                  MOV     #60000,R5       ;;ADDRESS 60000 INTO R5
3352 022042  012703  040000                  MOV     #40000,R3       ;ADDRESS 40000 INTO R3
3353 022046  012737  000015  177746  1$:     MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3354 022054  112737  000003  177750          MOVB    #HODO+TDAR,CMR  ;HODO ALLOWS VALID STORE  SET B TO
3355                                                                 ;BE WRITTEN TO CMR<12> ONLY DURING
3356                                                                 ;THE DESTINATION MEMORY ACCESS.
3357                                                                 ;TDAR WILL FORCE A 0 TO BE WRITTEN
3358                                                                 ;INTO VALID STORE WHEN A WRITE TO
3359                                                                 ;VALID STORE OCCURS
3360 022062  005713                          TST     (R3)
3361 022064  005715                          TST     (R5)            ;WRITE A 0 INTO VALID STORE ADDRESS
3362                                                                 ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3363 022066  005715                          TST     (R5)            ;WRITE VALID STORE DATA INTO CMR<12>
3364                                                                 ;FROM VALID STORE ADDRESS LOCATION
3365                                                                 ;JUST WRITTEN INTO.
3366 022070  013701  177750                  MOV     CMR,R1          ;SAVE CMR DATA
3367 022074  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     022076  000240                          NOP                     ;FOR  LOOP ON ERROR
3368 022100  105037  177750                  CLRB    CMR             ;DISABLE MAINT. MODE
3369 022104  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
3370 022112  032701  010000                  BIT     #VLD,R1         ;CMR<12> SHOULD BE 0.
3371 022116  001410                          BEQ     9$              ;PASS
3372 022120  010537  050506                  MOV     R5,CA121        ;SAVE VALID STORE ADDRESS LOCATION
3373                                                                 ;USED: CA<12:1>
3374 022124  006237  050506                  ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
3375 022130  104413                          ERROR                   ;ERROR
                                                                     ;-----
     022132  022130                          .WORD   .-2
```

TEST # 132 - WRITE AND READ 0'S TO ALL LOW CACHE VALID

```
3376                                                        ;VALID BITS STORE TESTS-SET B
3377                                                        ;READING VALID STORE DATA SET B
3378                                                        ;THRU CMR<12> DID NOT RESULT IN 0.
3379 022134  050506                    CA121               ;PRINT VALID STORE ADDRESS LOCATION
3380                                                        ;USED: CA<12:1>.
3381 022136  000000                    .WORD   0
3382 022140  062705  000002      9$:    ADD     #2,R5      ;NEXT VALID STORE LOCATION
3383 022144  062703  000002             ADD     #2,R3
3384 022150  020527  070000             CMP     R5,#70000  ;HAVE ALL LOW CACHE ADDRESS LOCATIONS BEEN DONE?
3385 022154  001334                    BNE     1$         ;NO
3386 022156  000240              10$:  NOP                ;END OF TEST
     022160  005237  001472             INC     $TESTN     ;INCREMENT TEST COUNTER
```

```
3392                                    .SBTTL  TEST # 133 - WRITE AND READ 1'S TO ALL LOW CACHE VALID
                                        ;;*****************************************************************
                                        ;*TEST 133      WRITE AND READ 1'S TO ALL LOW CACHE VALID
                                        ;*       WRITE AND READ 1'S TO ALL LOW CACHE  VALID
                                        ;*       BIT STORE ADDRESS LOCATIONS- SET B
                                        ;*       (VALID STORE LOCATIONS 0000 TO 3777)
                                        ;;*****************************************************************
     022164                             TST133:
     022164  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     022166  022176                             .WORD   40$             ;TEST START LOCATION
     022170  070036                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     022172  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     022174  070064                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     022176  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     022204  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     022210  022362                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

3393 022212  032737  020000  177746             BIT     #VSIU,CCR       ;IS SET B BEING USED?
3394 022220  001007                             BNE     3$              ;YES
3395 022222  052737  000400  177746             BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET B
3396 022230  032737  010000  177746  200$:      BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3397 022236  001374                             BNE     200$
3398 022240  012705  060000             3$:     MOV     #60000,R5       ;;ADDRESS 60000 INTO R5
3399 022244  012703  040000                     MOV     #40000,R3       ;ADDRESS 40000 INTO R3
3400 022250  012737  000015  177746  1$:        MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3401 022256  112737  000002  177750             MOVB    #HODO,CMR       ;HODO ALLOWS VALID STORE  SET B TO
3402                                                                    ;BE WRITTEN TO CMR<12> ONLY DURING
3403                                                                    ;THE DESTINATION MEMORY ACCESS.
3404 022264  005713                             TST     (R3)
3405 022266  005715                             TST     (R5)            ;WRITE A 1 INTO VALID STORE ADDRESS
3406                                                                    ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3407 022270  005715                             TST     (R5)            ;WRITE VALID STORE DATA INTO CMR<12>
3408                                                                    ;FROM VALID STORE ADDRESS LOCATION
3409                                                                    ;JUST WRITTEN INTO.
3410 022272  013701  177750                     MOV     CMR,R1          ;SAVE CMR DATA
3411 022276  000240                 25$:        NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     022300  000240                             NOP                     ;FOR  LOOP ON ERROR
3412 022302  105037  177750                     CLRB    CMR             ;DISABLE MAINT. MODE
3413 022306  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
3414 022314  032701  010000                     BIT     #VLD,R1         ;CMR<12> SHOULD BE 1.
3415 022320  001010                             BNE     9$              ;PASS
3416
3417 022322  010537  050506                     MOV     R5,CA121        ;SAVE VALID STORE ADDRESS LOCATION
3418                                                                    ;USED: CA<12:1>
3419 022326  006237  050506                     ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
3420 022332  104413                             ERROR                   ;ERROR
                                                                        ;-----
     022334  022332                             .WORD   .-2
3421                                                                    ;VALID BITS STORE TESTS - SET B
3422                                                                    ;READING VALID STORE DATA SET B
3423                                                                    ;THRU CMR<12> DID NOT RESULT IN 1.
3424 022336  050506                             CA121                   ;PRINT VALID STORE ADDRESS LOCATION
3425                                                                    ;USED: CA<12:1>.
```

TEST # 133 - WRITE AND READ 1'S TO ALL LOW CACHE VALID

```
3426 022340  000000                    .WORD   0
3427 022342  062705  000002      9$:   ADD     #2,R5           ;NEXT VALID STORE LOCATION
3428 022346  062703  000002            ADD     #2,R3
3429 022352  020527  070000            CMP     R5,#70000       ;HAVE ALL LOW CACHE ADDRESS LOCATIONS BEEN DONE?
3430 022356  001334                    BNE     1$              ;NO
3431 022360  000240              10$:  NOP                     ;END OF TEST
     022362  005237  001472            INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 134 - WRITE AND READ 0'S TO ALL HIGH CACHE VALID
                                ;;*****************************************************************
                                ;*TEST 134      WRITE AND READ 0'S TO ALL HIGH CACHE VALID
                                ;*      WRITE AND READ 0'S TO ALL HIGH CACHE  VALID
                                ;*      BIT STORE ADDRESS LOCATIONS- SET B
                                ;*      (VALID STORE LOCATIONS 4000 TO 7777)
                                ;;*****************************************************************
022366                          TST134:
022366  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
022370  022400                          .WORD   40$             ;TEST START LOCATION
022372  060052                          .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
022374  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
022376  060100                          .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
022400  012737  001015  177746  40$:    MOV     #OFF,CCR        ;DISABLE CACHE
022406  004437  002424                  JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
022412  022600                          .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO LOW CACHE SPACE

3438 022414  032737  020000  177746          BIT     #VSIU,CCR       ;IS SET B BEING USED?
3439 022422  001007                          BNE     3$              ;YES
3440 022424  052737  000400  177746          BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET B
3441 022432  032737  010000  177746  200$:   BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3442 022440  001374                          BNE     200$
3443 022442  012737  177777  177752  3$:     MOV     #-1,CHR         ;LOAD AMR<21:0> WITH 1'S VIA CHR AND CMR
3444                                                                 ;REGISTERS, SINCE TDAR WILL BE USED
3445 022450  112737  000374  177751          MOVB    #374,CMR+1
3446 022456  012705  070000                  MOV     #70000,R5       ;;ADDRESS 70000 INTO R5
3447 022462  012703  050000                  MOV     #50000,R3       ;ADDRESS 50000 INTO R3
3448 022466  012737  000015  177746  1$:     MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3449 022474  112737  000003  177750          MOVB    #HODO+TDAR,CMR  ;HODO ALLOWS VALID STORE  SET B TO
3450                                                                 ;BE WRITTEN TO CMR<12> ONLY DURING
3451                                                                 ;THE DESTINATION MEMORY ACCESS.
3452                                                                 ;TDAR WILL FORCE A 0 TO BE WRITTEN
3453                                                                 ;INTO VALID STORE WHEN A WRITE TO
3454                                                                 ;VALID STORE OCCURS
3455 022502  005713                          TST     (R3)
3456 022504  005715                          TST     (R5)            ;WRITE A 0 INTO VALID STORE ADDRESS
3457                                                                 ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3458 022506  005715                          TST     (R5)            ;WRITE VALID STORE DATA INTO CMR<12>
3459                                                                 ;FROM VALID STORE ADDRESS LOCATION
3460                                                                 ;JUST WRITTEN INTO.
3461 022510  013701  177750                  MOV     CMR,R1          ;SAVE CMR DATA
3462 022514  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     022516  000240                          NOP                     ;FOR  LOOP ON ERROR
3463 022520  105037  177750                  CLRB    CMR             ;DISABLE MAINT. MODE
3464 022524  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
3465 022532  032701  010000                  BIT     #VLD,R1         ;CMR<12> SHOULD BE 0.
3466 022536  001410                          BEQ     9$              ;PASS
3467
3468 022540  010537  050506                  MOV     R5,CA121        ;SAVE VALID STORE ADDRESS LOCATION
3469                                                                 ;USED: CA<12:1>
3470 022544  006237  050506                  ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
3471 022550  104413                          ERROR                   ;ERROR
                                                                     ;-----
```

TEST # 134 - WRITE AND READ 0'S TO ALL HIGH CACHE VALID

```
        022552  022550                          .WORD   .-2
3472                                                    ;VALID BITS STORE TESTS - SET B
3473                                                    ;READING VALID STORE DATA SET B
3474                                                    ;THRU CMR<12> DID NOT RESULT IN 0.
3475    022554  050506                          CA121                   ;PRINT VALID STORE ADDRESS LOCATION
3476                                                    ;USED: CA<12:1>.
3477    022556  000000                          .WORD   0
3478    022560  062705  000002          9$:     ADD     #2,R5           ;NEXT VALID STORE LOCATION
3479    022564  062703  000002                  ADD     #2,R3
3480    022570  020527  100000                  CMP     R5,#100000      ;HAVE ALL HIGH CACHE ADDRESS LOCATIONS BEEN DONE?
3481    022574  001334                          BNE     1$              ;NO
3482    022576  000240                  10$:    NOP                     ;END OF TEST
        022600  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
3488                                    .SBTTL  TEST # 135 - WRITE AND READ 1'S TO ALL HIGH CACHE VALID
                                        ;;*****************************************************************
                                        ;*TEST 135      WRITE AND READ 1'S TO ALL HIGH CACHE VALID
                                        ;*      WRITE AND READ 1'S TO ALL HIGH CACHE  VALID
                                        ;*      BIT STORE ADDRESS LOCATIONS- SET B
                                        ;*      (VALID STORE LOCATIONS 4000 TO 7777)
                                        ;;*****************************************************************
                                        TST135:
     022604
     022604  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     022606  022616                             .WORD   40$             ;TEST START LOCATION
     022610  060036                             .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
     022612  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     022614  060064                             .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
     022616  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     022624  004437  002424                     JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
     022630  023002                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

3489 022632  032737  020000  177746             BIT     #VSIU,CCR       ;IS SET B BEING USED?
3490 022640  001007                             BNE     3$              ;YES
3491 022642  052737  000400  177746             BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET B
3492 022650  032737  010000  177746  200$:      BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3493 022656  001374                             BNE     200$
3494 022660  012705  070000             3$:     MOV     #70000,R5       ;;ADDRESS 70000 INTO R5
3495 022664  012703  050000                     MOV     #50000,R3       ;ADDRESS 50000 INTO R3
3496 022670  012737  000015  177746  1$:        MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3497 022676  112737  000002  177750             MOVB    #HODO,CMR       ;HODO ALLOWS VALID STORE  SET B TO
3498                                                                    ;BE WRITTEN TO CMR<12> ONLY DURING
3499                                                                    ;THE DESTINATION MEMORY ACCESS.
3500 022704  005713                             TST     (R3)
3501 022706  005715                             TST     (R5)            ;WRITE A 1 INTO VALID STORE ADDRESS
3502                                                                    ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3503 022710  005715                             TST     (R5)            ;WRITE VALID STORE DATA INTO CMR<12>
3504                                                                    ;FROM VALID STORE ADDRESS LOCATION
3505                                                                    ;JUST WRITTEN INTO.
3506 022712  013701  177750             MOV     CMR,R1          ;SAVE CMR DATA
3507 022716  000240                 25$:        NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     022720  000240                             NOP                     ;FOR  LOOP ON ERROR
3508 022722  105037  177750                     CLRB    CMR             ;DISABLE MAINT. MODE
3509 022726  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
3510 022734  032701  010000                     BIT     #VLD,R1         ;CMR<12> SHOULD BE 1.
3511 022740  001010                             BNE     9$              ;PASS
3512 022742  010537  050506                     MOV     R5,CA121        ;SAVE VALID STORE ADDRESS LOCATION
3513                                                                    ;USED: CA<12:1>
3514 022746  006237  050506                     ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
3515 022752  104413                             ERROR                   ;ERROR
                                                                        ;-----
     022754  022752                             .WORD   .-2
3516                                                                    ;VALID STORE BIT TEST- SET B
3517                                                                    ;READING VALID STORE DATA SET B
3518                                                                    ;THRU CMR<12> DID NOT RESULT IN 0.
3519 022756  050506                             CA121                   ;PRINT VALID STORE ADDRESS LOCATION
3520                                                                    ;USED: CA<12:1>.
3521 022760  000000                             .WORD   0
```

TEST # 135 - WRITE AND READ 1'S TO ALL HIGH CACHE VALID

```
3522 022762  062705  000002        9$:     ADD     #2,R5           ;NEXT VALID STORE LOCATION
3523 022766  062703  000002                ADD     #2,R3
3524 022772  020527  100000                CMP     R5,#100000      ;HAVE ALL HIGH CACHE ADDRESS LOCATIONS BEEN DONE?
3525 022776  001334                       BNE     1$              ;NO
3526 023000  000240              10$:     NOP                     ;END OF TEST
     023002  005237  001472                INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
3530                                    .SBTTL  TEST # 136 - CHK VALID DATA STORE ADRS LINES (CA(12:1)) SET B
                                        ;;*****************************************************************
                                        ;*TEST 136      CHK VALID DATA STORE ADRS LINES (CA(12:1)) SET B
                                        ;*      VERIFY VALID DATA STORE ADDRESS LINES (CA<12:1>) -  SET B
                                        ;;*****************************************************************
        023006                          TST136:
        023006  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
        023010  023020                  .WORD   40$                     ;TEST START LOCATION
        023012  070054                  .WORD   1$-40$+67764            ;LOOP ON ERROR START LOCATION
        023014  000000                  .WORD   0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
        023016  070130                  .WORD   25$-40$+67764           ;LOOP ON ERROR END LOCATION
        023020  012737  001015  177746  40$:    MOV     #OFF,CCR        ;DISABLE CACHE
        023026  004437  002452                  JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
        023032  023250                  .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

3531 023034  032737  020000  177746          BIT     #VSIU,CCR       ;IS SET B BEING USED?
3532 023042  001007                          BNE     3$              ;YES
3533 023044  052737  000400  177746          BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET B
3534 023052  032737  010000  177746  4$:     BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3535 023060  001374                          BNE     4$
3536 023062  012737  000002  050516  3$:     MOV     #2,FLTPAT       ;1ST FLOATING CACHE DATA STORE ADDRESS PATTERN
3537 023070  012702  040000          2$:     MOV     #40000,R2       ;
3538 023074  012703  060000                  MOV     #60000,R3       ;
3539 023100  063702  050516                  ADD     FLTPAT,R2       ;R2 CONTAINS 40000+FLTPAT
3540 023104  063703  050516                  ADD     FLTPAT,R3       ;R3 CONTAINS 60000+FLTPAT
3541 023110  112737  000002  177750  1$:     MOVB    #HODO,CMR       ;HODO ALLOWS VALID DATA STORE BITS TO BE
3542                                                                  ;WRITTEN TO CMR<12> ONLY DURING THE
3543                                                                  ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
3544 023116  012737  000015  177746          MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3545 023124  152737  000001  177750          BISB    #TDAR,CMR       ;TDAR WILL FORCE A 0 TO BE WRITTEN
3546                                                                  ;INTO VALID STORE WHEN A WRITE TO
3547                                                                  ;VALID STORE OCCURS.
3548 023132  005737  040000                  TST     40000
3549 023136  005737  060000                  TST     60000           ;WRITE 0 INTO VALID STORE LOCATION 0000.
3550 023142  142737  000001  177750          BICB    #TDAR,CMR       ;CLEARING TDAR WILL ALLOW A 1 TO BE
3551                                                                  ;WRITTEN INTO VALID STORE WHEN A WRITE
3552                                                                  ;TO VALID STORE OCCURS.
3553 023150  005712                          TST     (R2)
3554 023152  005713                          TST     (R3)            ;WRITE 1 INTO VALID STORE LOCATION
3555                                                                  ;SPECIFIED BY R3'S BITS 1 THRU 12:CA<12:1>.
3556 023154  005737  060000                  TST     60000           ;LOAD DATA FROM VALID DATA STORE LOCATION
3557                                                                  ;0000 INTO CMR<12>.
3558 023160  013701  177750                  MOV     CMR,R1          ;SAVE CMR DATA
3559 023164  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     023166  000240                          NOP                     ;FOR  LOOP ON ERROR
3560 023170  105037  177750                  CLRB    CMR             ;DISABLE MAINT. MODE
3561 023174  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
3562 023202  032701  010000                  BIT     #VLD,R1         ;CMR<12> SHOULD READ 0.
3563 023206  001411                          BEQ     9$              ;PASS
3564                                                          ;ROUTINE
3565 023210  013737  050516  050506          MOV     FLTPAT,CA121    ;SAVE CA<12:1> USED
3566 023216  006237  050506                  ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
3567 023222  104413                          ERROR                   ;ERROR
```

```
                                                                        ;-----
      023224  023222                          .WORD   .-2
3568                                                                    ;VALID STORE ADDRESS VERIFICATION- SET B
3569                                                                    ;VALID STORE LOCATION 0000 DID NOT
3570                                                                    ;READ AS A 0 INDICATING THAT IT WAS
3571                                                                    ;OVERWRITTEN WITH A 1. THIS SUGGESTS
3572                                                                    ;A BAD CA<12:1> VALID STORE ADDRESS LINE.
3573 023226  050506                          CA121                     ;PRINT VALID STORE ADDRESS FAILURE: CA<12:1>.
3574                                                                    ;NOTE THAT THE 1 IN THIS PATTERN
3575                                                                    ;WILL POINT TO THE ADDRESS LINE
3576                                                                    ;THAT BROUGHT OUT ERROR.
3577 023230  000000                          .WORD   0
3578 023232  006337  050516          9$:     ASL     FLTPAT            ;NEXT PATTERN
3579 023236  022737  020000  050516          CMP     #20000,FLTPAT     ;HAS VALID DATA STORE  ADDRESS 4000 BEEN DONE?
3580 023244  001311                          BNE     2$                ;NO
3581 023246  000240                  10$:    NOP                       ;END OF TEST
     023250  005237  001472                  INC     $TESTN            ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 137 - ALL LOW CACHE VALID STORE SET B ADDRESS LOCATIONS
                                ;;*****************************************************************
                                ;*TEST 137      ALL LOW CACHE VALID STORE SET B ADDRESS LOCATIONS
                                ;*      VERIFY THAT ALL LOW CACHE VALID STORE SET B ADDRESS LOCATIONS
                                ;*      WILL BE INVALIDATED AS A RESULT OF A CACHE FLUSH.
                                ;*      (FLUSH COUNTER ADDRESS LOCATIONS [CNT<12:1>]: 0000-3777)
                                ;;*****************************************************************
      023254                    TST137:
      023254  000004                    SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
      023256  023266                    .WORD   40$             ;TEST START LOCATION
      023260  070074                    .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
      023262  000000                    .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      023264  070130                    .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
      023266  012737  001015  177746 40$:  MOV   #OFF,CCR       ;DISABLE CACHE
      023274  004437  002452           JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
      023300  023526                    .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE

3588  023302  012705  060000          MOV     #60000,R5       ;;ADDRESS 60000 INTO R5
3589  023306  012703  040000          MOV     #40000,R3       ;ADDRESS 40000 INTO R3
3590  023312  032737  020000  177746  BIT     #VSIU,CCR       ;IS SET B BEING USED?
3591  023320  001007                  BNE     3$              ;YES
3592  023322  052737  000400  177746  BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET B
3593  023330  032737  010000  177746 200$:  BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3594  023336  001374                  BNE     200$
3595  023340  012737  000015  177746 3$:   MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3596  023346  112737  000002  177750       MOVB    #HODO,CMR       ;HODO ALLOWS VALID STORE  SET B TO
3597                                                                ;BE WRITTEN TO CMR<12> ONLY DURING
3598                                                                ;THE DESTINATION MEMORY ACCESS.
3599  023354  005713                4$:    TST     (R3)
3600  023356  005715                       TST     (R5)            ;WRITE A 1 INTO VALID STORE ADDRESS
3601                                                                ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3602  023360  062705  000002          ADD     #2,R5           ;NEXT VALID STORE LOCATION
3603  023364  062703  000002          ADD     #2,R3
3604  023370  020527  070000          CMP     R5,#70000       ;HAVE ALL LOW CACHE LOCATIONS BEEN DONE?
3605  023374  001367                  BNE     4$              ;NO
3606  023376  052737  000400  177746 1$:   BIS     #FC,CCR         ;FLUSH CACHE TO SELECT SET A AND
3607                                                                ;INVALIDATE SET B
3608  023404  032737  010000  177746 500$: BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3609  023412  001374                  BNE     500$
3610  023414  052737  000400  177746       BIS     #FC,CCR         ;FLUSH TO SELECT SET B AGAIN
3611  023422  032737  010000  177746 6$:   BIT     #VCIP,CCR       ;WAIT
3612  023430  001374                  BNE     6$
3613  023432  000240                25$:   NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      023434  000240                       NOP                     ;FOR  LOOP ON ERROR
3614  023436  012705  060000          MOV     #60000,R5       ;ADDRESS 60000 INTO R5
3615  023442  005715                2$:    TST     (R5)            ;WRITE VALID STORE DATA INTO CMR<12>
3616                                                                ;FROM ADDRESS LOCATION SPECIFIED BY
3617                                                                ;R5'S BITS 12-1.
3618  023444  013701  177750          MOV     CMR,R1          ;SAVE CMR DATA
3619  023450  032701  010000          BIT     #VLD,R1         ;CMR<12> SHOULD BE 0
3620  023454  001416                  BEQ     9$              ;PASS
3621  023456  105037  177750          CLRB    CMR             ;DISABLE MAINT MODE
3622  023462  012737  001015  177746       MOV     #OFF,CCR        ;DISABLE CACHE
```

TEST # 137 - ALL LOW CACHE VALID STORE SET B ADDRESS LOCATIONS

```
3623 023470  010537  050514                    MOV     R5,CNT121       ;SAVE VALID STORE FLUSH ADDRESS LOCATION
3624                                                                     ;USED: CNT<12:1>
3625 023474  006237  050514                    ASR     CNT121          ;PREPARE CNT121 FOR TYPEOUT
3626 023500  104413                            ERROR                   ;ERROR
                                                                        ;-----
     023502  023500                            .WORD   .-2
3627                                                                     ;FLUSH CACHE INVALID TEST-SET B
3628                                                                     ;READING VALID STORE LOCATION FROM SET B THRU CMR<12>
3629                                                                     ;DID NOT RESULT IN A ZERO,INDICATING THAT
3630                                                                     ;THE CACHE FLUSH DID NOT INVALIDATE THIS
3631                                                                     ; LOCATION.
3632 023504  050514                            CNT121                  ;PRINT VALID STORE FLUSH ADDRESS LOCATION
3633                                                                     ;IN ERROR: CNT<12:1>.
3634 023506  000000                            .WORD   0
3635 023510  000405                            BR      10$             ;IF ERROR, END TEST
3636 023512  062705  000002          9$:       ADD     #2,R5           ;NEXT VALID STORE LOCATION
3637 023516  020527  070000                    CMP     R5,#70000       ;HAVE ALL LOW CACHE ADDRESS LOCATIONS BEEN DONE?
3638 023522  001347                            BNE     2$              ;NO
3639 023524  000240                  10$:      NOP                     ;END OF TEST
     023526  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
3645                                    .SBTTL  TEST # 140 - ALL HI CACHE VALID STORE SET B ADDRESS LOCATIONS
                                        ;;*****************************************************************
                                        ;*TEST 140      ALL HI CACHE VALID STORE SET B ADDRESS LOCATIONS
                                        ;*      VERIFY THAT ALL HI CACHE VALID STORE SET B ADDRESS LOCATIONS
                                        ;*      WILL BE INVALIDATED AS A RESULT OF A CACHE FLUSH.
                                        ;*      (FLUSH COUNTER ADDRESS LOCATIONS [CNT<12:1>]: 4000-7777)
                                        ;;*****************************************************************
     023532                             TST140:
     023532  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     023534  023544                             .WORD   40$             ;TEST START LOCATION
     023536  060074                             .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
     023540  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     023542  060130                             .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
     023544  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     023552  004437  002424                     JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
     023556  024004                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

3646 023560  012705  070000                     MOV     #70000,R5       ;;ADDRESS 70000 INTO R5
3647 023564  012703  050000                     MOV     #50000,R3       ;ADDRESS 50000 INTO R3
3648 023570  032737  020000  177746             BIT     #VSIU,CCR       ;IS SET B BEING USED?
3649 023576  001007                             BNE     3$              ;YES
3650 023600  052737  000400  177746             BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET B
3651 023606  032737  010000  177746  200$:      BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3652 023614  001374                             BNE     200$
3653 023616  012737  000015  177746  3$:        MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3654 023624  112737  000002  177750             MOVB    #HODO,CMR       ;HODO ALLOWS VALID STORE  SET B TO
3655                                                                    ;BE WRITTEN TO CMR<12> ONLY DURING
3656                                                                    ;THE DESTINATION MEMORY ACCESS.
3657 023632  005713                     4$:     TST     (R3)
3658 023634  005715                             TST     (R5)            ;WRITE A 1 INTO VALID STORE ADDRESS
3659                                                                    ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3660 023636  062705  000002                     ADD     #2,R5           ;NEXT VALID STORE LOCATION
3661 023642  062703  000002                     ADD     #2,R3
3662 023646  020527  100000                     CMP     R5,#100000      ;HAVE ALL HI CACHE LOCATIONS BEEN DONE?
3663 023652  001367                             BNE     4$              ;NO
3664 023654  052737  000400  177746  1$:        BIS     #FC,CCR         ;FLUSH CACHE TO SELECT SET A AND
3665                                                                    ;INVALIDATE SET B
3666 023662  032737  010000  177746  500$:      BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3667 023670  001374                             BNE     500$
3668 023672  052737  000400  177746             BIS     #FC,CCR         ;FLUSH TO SELECT SET B AGAIN
3669 023700  032737  010000  177746  6$:        BIT     #VCIP,CCR       ;WAIT
3670 023706  001374                             BNE     6$
3671 023710  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     023712  000240                             NOP                     ;FOR  LOOP ON ERROR
3672 023714  012705  070000                     MOV     #70000,R5       ;ADDRESS 70000 INTO R5
3673 023720  005715                     2$:     TST     (R5)            ;WRITE VALID STORE DATA INTO CMR<12>
3674                                                                    ;FROM ADDRESS LOCATION SPECIFIED BY
3675                                                                    ;R5'S BITS 12-1.
3676 023722  013701  177750                     MOV     CMR,R1          ;SAVE CMR DATA
3677 023726  032701  010000                     BIT     #VLD,R1         ;CMR<12> SHOULD BE 0
3678 023732  001416                             BEQ     9$              ;PASS
3679 023734  105037  177750                     CLRB    CMR             ;DISABLE MAINT MODE
3680 023740  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
```

```
3681 023746  010537  050514                MOV     R5,CNT121       ;SAVE VALID STORE FLUSH ADDRESS LOCATION
3682                                                                ;USED: CNT<12:1>
3683 023752  006237  050514                ASR     CNT121          ;PREPARE CNT121 FOR TYPEOUT
3684 023756  104413                        ERROR                   ;ERROR
                                                                    ;-----
     023760  023756                        .WORD   .-2
3685                                                                ;FLUSH CACHE INVALID TEST-SET B
3686                                                                ;READING VALID STORE LOCATION FROM SET B THRU CMR<12>
3687                                                                ;DID NOT RESULT IN A ZERO,INDICATING THAT
3688                                                                ;THE CACHE FLUSH DID NOT INVALIDATE THIS
3689                                                                ; LOCATION.
3690 023762  050514                        CNT121                  ;PRINT VALID STORE FLUSH ADDRESS LOCATION
3691                                                                ;IN ERROR: CNT<12:1>.
3692 023764  000000                        .WORD   0
3693 023766  000405                        BR      10$             ;IF ERROR,END TEST
3694 023770  062705  000002          9$:   ADD     #2,R5           ;NEXT VALID STORE LOCATION
3695 023774  020527  100000                CMP     R5,#100000      ;HAVE ALL HI CACHE ADDRESS LOCATIONS BEEN DONE?
3696 024000  001347                        BNE     2$              ;NO
3697 024002  000240                10$:   NOP                     ;END OF TEST
     024004  005237  001472                INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 141 - TEST UPDATE TO CACHE DATA ON HIT/MISS
                                ;;*****************************************************************
                                ;*TEST 141       TEST UPDATE TO CACHE DATA ON HIT/MISS
                                ;*      VERIFY THE FOLLOWING:
                                ;*              1. NO UPDATE OCCURS TO CACHE DATA STORE DUE TO A WRITE MISS
                                ;*              2. UPDATE DOES OCCUR TO CACHE DATA STORE DUE TO A WRITE HIT
                                ;;*****************************************************************
                                TST141:
024010
024010  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
024012  024022                          .WORD   40$             ;TEST START LOCATION
024014  070000                          .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
024016  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
024020  070064                          .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
024022  012737  001015  177746  40$:    MOV     #OFF,CCR        ;DISABLE CACHE
024030  004437  002452                  JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
024034  024230                          .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE

3704 024036  005037  060000    1$:     CLR     60000           ;0'S TO MAIN MEMORY LOCATION
3705 024042  005037  000000            CLR     0               ;CLEAR LOCATION 0
3706 024046  012700  177777            MOV     #-1,R0          ;ALL 1'S TO R0
3707 024052  012701  060000            MOV     #60000,R1       ;ADDRESS 60000 TO R1
3708 024056  112737  000002  177750    MOVB    #HODO,CMR       ;ALLOWS CACHE UPDATES &  DATA STORE BITS TO BE
3709                                                            ;WRITTEN TO CDR<15:0> ONLY DURING THE
3710                                                            ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
3711 024064  012737  000015  177746    MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
3712 024072  005737  060000            TST     60000           ;
3713 024076  005737  000000            TST     0               ;READ UPDATE;  ALL 0'S TO  DATA STORE
3714                                                            ;LOCATION 0000 FROM MAIN MEMORY
3715                                                            ;LOC. 0
3716 024102  010011                    MOV     R0,(R1)         ;WRITE MISS;NO UPDATE SHOULD OCCUR
3717                                                            ;TO DATA STORE LOCATION 0000
3718 024104  005711                    TST     (R1)            ;READ MISS;LOAD DATA STORE BITS RESULTING
3719                                                            ;FROM PREVIOUS WRITE MISS INTO CDR<15:0>
3720 024106  013702  177754            MOV     CDR,R2          ;SAVE CDR CONTENTS
3721 024112  010011                    MOV     R0,(R1)         ;WRITE HIT;
3722                                                            ;THIS WRITE HIT SHOULD UPDATE DATA
3723                                                            ;STORE LOCATION 0000.
3724 024114  005711                    TST     (R1)            ;READ HIT;LOAD DATA STORE BITS RESULTING
3725                                                            ;FROM PREVIOUS WRITE HIT INTO CDR<15:0>
3726 024116  013703  177754            MOV     CDR,R3          ;SAVE CDR CONTENTS
3727 024122  000240            25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     024124  000240                    NOP                     ;FOR  LOOP ON ERROR
3728 024126  105037  177750            CLRB    CMR             ;DISABLE MAINTENANCE
3729 024132  012737  001015  177746    MOV     #OFF,CCR        ;DISABLE CACHE
3730 024140  012737  000002  000000    MOV     #2,0            ;RESTORE VECTOR
3731 024146  005702                    TST     R2              ;CHECK FOR ALL 0'S
3732 024150  001411                    BEQ     8$              ;PASS
3733 024152  005037  050504            CLR     EXDAT6          ;SPECIFY EXPECTED DATA
3734 024156  010237  050502            MOV     R2,CDR150       ;GET RECEIVED DATA FROM R2
3735 024162  104413                    ERROR                   ;ERROR
                                                                ;-----
     024164  024162                    .WORD   .-2
3736                                                            ;WRITE CONTROL LOGIC TEST
```

```
3737                                                    ;READING CDR<15:0> DID NOT RESULT IN ALL 0'S.
3738                                                    ;INDICATES THAT UPDATE  OCCURED
3739                                                    ;DUE TO WRITE MISS.
3740 024166  050504                    EXDAT6           ;PRINT CDR<15:0> EXPECTED DATA
3741 024170  050502                    CDR150           ;PRINT CDR<15:0> DATA RECEIVED.
3742 024172  000000                    .WORD   0
3743 024174  022703  177777      8$:   CMP     #-1,R3    ;CHECK FOR ALL 1'S
3744 024200  001412                    BEQ     10$       ;PASS
3745 024202  012737  177777  050504    MOV     #-1,EXDAT6 ;SPECIFY EXPECTED DATA
3746 024210  010337  050502            MOV     R3,CDR150 ;GET RECEIVED DATA FROM R3
3747 024214  104413                    ERROR             ;ERROR
                                                        ;-----
     024216  024214                    .WORD   .-2
3748                                                    ;WRITE CONTROL LOGIC TEST
3749                                                    ;READING CDR<15:0> DID NOT RESULT IN ALL 1'S.
3750                                                    ;INDICATES THAT UPDATE  DID NOT OCCUR
3751                                                    ;DUE TO WRITE HIT.
3752 024220  050504                    EXDAT6           ;PRINT CDR<15:0> EXPECTED DATA
3753 024222  050502                    CDR150           ;PRINT CDR<15:0> DATA RECEIVED.
3754 024224  000000                    .WORD   0
3755 024226  000240            10$:   NOP              ;END OF TEST
     024230  005237  001472            INC     $TESTN    ;INCREMENT TEST COUNTER
```

```
3763                                    .SBTTL  TEST # 142 - TEST WRITE CONTROL LOGIC INHIBIT MODE
                                        ;;*****************************************************************
                                        ;*TEST 142       TEST WRITE CONTROL LOGIC INHIBIT MODE
                                        ;*      VERIFY THAT THE WRITE CONTROL LOGIC WILL BE INHIBITED FROM UPDATING
                                        ;*      TAG STORE DUE TO A READ HIT.
                                        ;*PROCEDURE:  CREATE READ HIT TO LOW CACHE WITH FMLO ENABLED.  FMLO WILL
                                        ;*      INHIBIT CPU RESTART SIGNAL SO THAT A POTENTIAL WRITE SIGNAL COULD
                                        ;*      CONTROL LOGIC SHOULD BE INHIBITED DUE TO READ HIT.
                                        ;;*****************************************************************
     024234                             TST142:
     024234  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     024236  024246                             .WORD   40$             ;TEST START LOCATION
     024240  070000                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     024242  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR THIS TEST
     024244  070064                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     024246  012737  001015  177746     40$:    MOV     #OFF,CCR        ;DISABLE CACHE
     024254  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     024260  024440                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

3764 024262  012737  177777  177752     1$:     MOV     #-1,CHR         ;LOAD AMR<8:0> BY WRITING ALL 1'S TO CHR<8:0>
3765 024270  112737  000002  177750             MOVB    #HODO,CMR       ;HODO ALLOWS CACHE TAG FIELD BITS TO BE
3766                                                                    ;WRITTEN TO CHR<15:07> ONLY DURING
3767                                                                    ;THE DESTINATION MEMORY ACCESS
3768                                                                    ;OF AN INSTRUCTION
3769 024276  012737  000015  177746             MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE
3770 024304  005737  040000                     TST     40000
3771 024310  005737  000000                     TST     0               ;READ UPDATE;LOAD TAG STORE WITH ALL 0'S
3772 024314  052737  000001  177750             BIS     #TDAR,CMR       ;TDAR WILL ALLOW TAG STORE TO BE
3773                                                                    ;WRITTEN WITH CONTENTS OF AMR<8:0>
3774                                                                    ;IF AN UPDATE OCCURS.
3775 024322  005737  000000                     TST     0               ;READ HIT; WRITE CONTROL LOGIC SHOULD
3776                                                                    ;BE INHIBITED FROM ISSUING A WRITE
3777                                                                    ;SIGNAL
3778 024326  005737  000000                     TST     0               ;WRITE TAG FIELD DATA FROM TAG STORE
3779                                                                    ;LOCATION 0000 INTO CHR.
3780 024332  013737  177752  050474             MOV     CHR,CHR157      ;SAVE CHR DATA
3781 024340  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
3782 024346  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     024350  000240                             NOP                     ;FOR  LOOP ON ERROR
3783 024352  105037  177750                     CLRB    CMR             ;DISABLE MAINTENANCE MODE
3784 024356  042737  000177  050474             BIC     #177,CHR157     ;INTERESTED IN 15:07
3785 024364  005737  050474                     TST     CHR157          ;BITS 15:07 SHOULD BE ALL 0'S
3786 024370  001422                             BEQ     10$             ;PASS
3787 024372  012737  000007  002062             MOV     #7,LOOP         ;ERROR;PREPARE CHR157 FOR TYPEOUT
3788 024400  006237  050474             2$:     ASR     CHR157
3789 024404  042737  100000  050474             BIC     #100000,CHR157
3790 024412  005337  002062                     DEC     LOOP
3791 024416  001370                             BNE     2$
3792 024420  005037  050522                     CLR     EXDAT3          ;INDICATE EXPECTED DATA
3793 024424  104413                             ERROR                   ;ERROR
                                                                        ;-----
     024426  024424                             .WORD   .-2
3794                                                                    ;WRITE CONTROL LOGIC TESTS
```

TEST # 142 - TEST WRITE CONTROL LOGIC INHIBIT MODE

```
                                                                ;READING TAG STORE DATA THRU CHR<15:07>
                                                                ;DID NOT RESULT IN ALL 0'S.
                                                                ;THIS SUGGESTS THAT AN UPDATE OCCURED
                                                                ;AND WRITE CONTROL LOGIC WAS NOT
                                                                ;INHIBITED DUE TO READ HIT.
3800 024430  050522                    EXDAT3                   ;PRINT CHR<15:07> EXPECTED
3801 024432  050474                    CHR157                   ;PRINT CHR<15:07> RECEIVED
3802 024434  000000                    .WORD   0
3803 024436  000240            10$:    NOP                      ;END OF TEST
     024440  005237  001472            INC     $TESTN           ;INCREMENT TEST COUNTER
```

```
3808                                    .SBTTL  TEST # 143 - WRITE CONTROL LOGIC INHIBIT TEST
                                        ;;*****************************************************************
                                        ;*TEST 143      WRITE CONTROL LOGIC INHIBIT TEST
                                        ;*      VERIFY THAT WRITE CONTROL LOGIC WILL INHIBIT A READ UPDATE
                                        ;*      TO CACHE TAG STORE DUE TO AN ACCESS TO I/O PAGE.
                                        ;;*****************************************************************
     024444
     024444  000004                     TST143: SCOPE                   ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     024446  024456                             .WORD   40$             ;TEST START LOCATION
     024450  060000                             .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
     024452  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     024454  060042                             .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
     024456  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
     024464  004437  002424                    JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
     024470  024640                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

3809 024472  112737  000002  177750  1$:       MOVB    #HODO,CMR       ;ALLOWS CACHE TAG FIELD BITS TO BE
3810                                                                     ;WRITTEN TO CHR<15:07> ONLY DURING
3811                                                                     ;THE DESTINATION MEMORY ACCESS
3812                                                                     ;OF AN INSTRUCTION
3813 024500  012737  000015  177746          MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
3814 024506  005737  057744                 TST     57744
3815 024512  005737  077744                 TST     77744           ;READ UPDATE;LOAD BIT PATTERN
3816                                                                 ;000000011 INTO TAG STORE LOCATION
3817                                                                 ;7762
3818 024516  005737  177744                 TST     177744          ;ACCESS I/O PAGE BY READING CCR REGISTER.
3819                                                                 ;THE CACHE COULD DO AN UPDATE TO
3820                                                                 ;TAG STORE LOCATION 7762 BUT THE ACCESS
3821                                                                 ;TO I/O PAGE WILL INHIBIT WRITE CONTROL
3822                                                                 ;LOGIC
3823 024522  005737  057744                 TST     57744           ;WRITE TAG STORE DATA FROM  LOCATION
3824                                                                 ;7762 INTO CHR<15:07>.
3825 024526  013737  177752  050474          MOV     CHR,CHR157      ;SAVE CHR DATA
3826 024534  000240                 25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     024536  000240                         NOP                     ;FOR  LOOP ON ERROR
3827 024540  105037  177750                 CLRB    CMR             ;DISABLE MAINTENANCE MODE
3828 024544  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
3829 024552  042737  000177  050474          BIC     #177,CHR157     ;PREPARE CHR157 FOR ERROR CHECK
3830 024560  022737  000600  050474          CMP     #600,CHR157     ;BITS 15:07 SHOULD BE BIT PATTERN 000000011
3831 024566  001423                         BEQ     10$             ;PASS
3832 024570  012737  000007  002062          MOV     #7,LOOP         ;ERROR;PREPARE CHR157 FOR TYPEOUT
3833 024576  006237  050474          2$:     ASR     CHR157
3834 024602  042737  100000  050474          BIC     #100000,CHR157
3835 024610  005337  002062                 DEC     LOOP
3836 024614  001370                         BNE     2$
3837 024616  012737  000003  050522          MOV     #3,EXDAT3       ;INDICATE EXPECTED DATA
3838 024624  104413                         ERROR                   ;ERROR
                                                                     ;-----
     024626  024624                         .WORD   .-2
3839                                                                 ;WRITE CONTROL LOGIC TESTS
3840                                                                 ;READING TAGD<21:13> THRU CHR<15:07>
3841                                                                 ;DID NOT RESULT IN BIT PATTERN 000000011.
3842 024630  050522                 EXDAT3                          ;PRINT CHR 15:07 EXPECTED
```

TEST # 143 - WRITE CONTROL LOGIC INHIBIT TEST

```
3843 024632  050474                        CHR157                  ;PRINT CHR <15:07> RECEIVED
3844 024634  000000                        .WORD   0
3845 024636  000240                 10$:    NOP                     ;END OF TEST
     024640  005237  001472                INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 144 - WRITE CONTROL AND VALID STORE LOGIC TEST
                                ;;*****************************************************************
                                ;*TEST 144      WRITE CONTROL AND VALID STORE LOGIC TEST
                                ;*      THIS TEST VERIFIES THE AREA OF WRITE CONTROL LOGIC AND VALID
                                ;*      STORE LOGIC THAT IS CONCERNED WITH BYPASS OPERATIONS. A WIRE STRAP
                                ;*      IS USED TO ALLOW OR INHIBIT INVALIDATION OF VALID STORE DURING
                                ;*      READ BYPASS CONDITIONS. UNLESS SWITCH REGISTER 08 IS IMPLEMENTED,
                                ;*      THIS TEST ASSUMES THAT STRAP W1 IS IN PLACE.
                                ;*PROCEDURE:    IF SWR 08 IS NOT IMPLEMENTED ,W1 IS ASSUMED IN PLACE. NO
                                ;*      INVALIDATION OF VALID STORE SET A SHOULD OCCUR DUE TO READ MISS/BYPASS
                                ;*      AND READ HIT/BYPASS CONDITIONS.  2. IF SWR 08 IS IMPLEMENTED, STRAP
                                ;*      W2 IS ASSUMED IN PLACE. NO INVALIDATION SHOULD OCCUR DUE TO READ
                                ;*      MISS/BYPASS, BUT INVALIDATION SHOULD OCCUR DUE TO READ HIT/BYPASS
                                ;*      CONDITION.
                                ;;*****************************************************************
024644                          TST144:
024644  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
024646  024656                        .WORD   40$             ;TEST START LOCATION
024650  070026                        .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
024652  000000                        .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
024654  070112                        .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
024656  012737  001015  177746 40$:   MOV     #OFF,CCR        ;DISABLE CACHE
024664  004437  002452                JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
024670  025112                        .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE

3860 024672  032737  020000  177746        BIT     #VSIU,CCR       ;IS SET A BEING USED?
3861 024700  001407                        BEQ     1$              ;YES
3862 024702  052737  000400  177746        BIS     #FC,CCR         ;NO,FLUSH CACHE FOR SET A
3863 024710  032737  010000  177746 200$:  BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3864 024716  001374                        BNE     200$
3865 024720  012737  000015  177746 1$:    MOV     #15,CCR         ;NO UCB SO AS TO ENABLE CACHE STORES
3866 024726  112737  000002  177750        MOVB    #HODO,CMR       ;HODO ALLOWS READ UPDATES,AND VALID
3867                                                                ;STORE DATA TO BE WRITTEN TO CMR <12>
3868                                                                ;ONLY DURING THE DESTINATION ACCESS
3869                                                                ;OF AN INSTRUCTION.
3870 024734  005737  040000                TST     40000           ;
3871 024740  005737  060000                TST     60000           ;READ UPDATE TO CACHE LOCATION 0000.
3872                                                                ;WRITE 1 INTO VALID STORE LOCATION 0000.
3873 024744  052737  001000  177746        BIS     #UCB,CCR        ;BYPASS MODE
3874 024752  005737  040000                TST     40000           ;READ MISS/BYPASS;
3875 024756  005737  060000                TST     60000           ;LOAD VALID STORE LOCATION 0000 DATA
3876                                                                ;RESULTING FROM PREVIOUS READ MISS/BYPASS
3877                                                                ;INTO CMR<12>.
3878                                                                ;THIS IS ALSO A READ HIT/BYPASS CONDITION.
3879 024762  013700  177750                MOV     CMR,R0          ;SAVE CMR CONTENTS
3880 024766  005737  040000                TST     40000           ;LOAD VALID STORE LOCATION 0000
3881                                                                ;DATA RESULTING FROM PREVIOUS READ HIT
3882                                                                ;/BYPASS INTO CMR<12>.
3883 024772  013701  177750                MOV     CMR,R1          ;SAVE CMR CONTENTS
3884 024776  012737  001015  177746        MOV     #OFF,CCR        ;DISABLE CACHE
3885 025004  000240                25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     025006  000240                        NOP                     ;FOR  LOOP ON ERROR
3886 025010  105037  177750                CLRB    CMR             ;DISABLE MAINTENANCE MODE
```

```
                                                    ;
                                                    ;IS STRAP W2 IN PLACE
                                                    ;YES
                                                    ;NO; W1 IS ASSUMED
                                                    ;PASS ;VALID DATA IS A 1
                                                    ;ERROR
                                                    ;-----
                                                    ;WRITE CONTROL LOGIC TESTS
                                                    ;STRAP W1 IS ASSUMED IN PLACE.
                                                    ;READ MISS/BYPASS CAUSED INVALIDATION
                                                    ;OF LOCATION 0000.
                                                    ;TEST VALID DATA HELD IN R1
                                                    ;PASS; STILL A 1
                                                    ;ERROR
                                                    ;-----
                                                    ;WRITE CONTROL LOGIC TESTS
                                                    ;STRAP W1 IS ASSUMED IN PLACE.
                                                    ;READ MISS/HIT CAUSED INVALIDATION
                                                    ;OF LOCATION 0000.
                                                    ; W2 IS ASSUMED IN PLACE
                                                    ;PASS ;VALID DATA IS A 1
                                                    ;ERROR
                                                    ;-----
                                                    ;WRITE CONTROL LOGIC TESTS
                                                    ;STRAP W2 IS ASSUMED IN PLACE.
                                                    ;READ MISS/BYPASS CAUSED INVALIDATION
                                                    ;OF LOCATION 0000.
                                                    ;TEST VALID DATA HELD IN R1
                                                    ;PASS; VALID DATA  IS A 0
                                                    ;ERROR
                                                    ;-----
                                                    ;WRITE CONTROL LOGIC TESTS
                                                    ;STRAP W2 IS ASSUMED IN PLACE.
                                                    ;READ MISS/HIT DID NOT CAUSE INVALIDATION
                                                    ;OF LOCATION 0000.
                                                    ;END OF TEST
                                                    ;INCREMENT TEST COUNTER
```

```
3924                                    .SBTTL  TEST # 145 - WRITE HIT IN BYPASS MODE INVALIDATES CACHE LOCATION
                                        ;;*****************************************************************
                                        ;*TEST 145       WRITE HIT IN BYPASS MODE INVALIDATES CACHE LOCATION
                                        ;;*****************************************************************
        025116                          TST145:
        025116  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
        025120  025130                          .WORD   40$             ;TEST START LOCATION
        025122  070026                          .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
        025124  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
        025126  070102                          .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
        025130  012737  001015  177746  40$:    MOV     #OFF,CCR        ;DISABLE CACHE
        025136  004437  002452                  JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
        025142  025274                          .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

3925    025144  032737  020000  177746          BIT     #VSIU,CCR       ;IS SET A BEING USED?
3926    025152  001407                  BEQ     1$                      ;YES
3927    025154  052737  000400  177746          BIS     #FC,CCR         ;NO,FLUSH CACHE FOR SET A
3928    025162  032737  010000  177746  200$:   BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
3929    025170  001374                  BNE     200$
3930    025172  012700  000002          1$:     MOV     #2,R0           ;DATA TO R0
3931    025176  005001                  CLR     R1                      ;ADDRESS 0 TO R1
3932    025200  012737  000015  177746          MOV     #15,CCR         ;NO UCB SO AS TO ENABLE CACHE STORES
3933    025206  112737  000002  177750          MOVB    #HODO,CMR       ;HODO ALLOWS READ UPDATES,AND VALID
3934                                            ;STORE DATA TO BE WRITTEN TO CMR <12>
3935                                            ;ONLY DURING THE DESTINATION ACCESS
3936                                            ;OF AN INSTRUCTION.
3937    025214  005737  040000                  TST     40000           ;
3938    025220  005711                  TST     (R1)                    ;READ UPDATE TO CACHE LOCATION 0000.
3939                                            ;WRITE 1 INTO VALID STORE LOCATION 0000.
3940    025222  052737  001000  177746          BIS     #UCB,CCR        ;BYPASS MODE
3941    025230  010011                  MOV     R0,(R1)                 ;WRITE HIT BYPASS TO LOC. 0 SHOULD INVALIDATE
3942    025232  005711                  TST     (R1)                    ;LOAD VALID STORE LOCATION 0000 DATA
3943                                            ;RESULTING FROM PREVIOUS WRITE HIT/BYPASS INTO CMR<12>.
3944    025234  013702  177750                  MOV     CMR,R2          ;SAVE CMR CONTENTS
3945    025240  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
3946    025246  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
        025250  000240                  NOP                             ;FOR  LOOP ON ERROR
3947    025252  105037  177750                  CLRB    CMR             ;DISABLE MAINTENANCE MODE
3948    025256  032702  010000                  BIT     #VLD,R2         ;CHECK FOR 0
3949    025262  001403                  BEQ     10$                     ;PASS
3950    025264  104413                  ERROR                           ;ERROR
                                                                        ;-----
        025266  025264                  .WORD   .-2
3951                                            ;WRITE CONTROL LOGIC TESTS
3952                                            ;WRITE HIT /BYPASS DID NOT INVALIDATE
3953                                            ;CACHE VALID STORE LOCATION
3954    025270  000000                  .WORD   0
3955    025272  000240                  10$:    NOP                     ;END OF TEST
        025274  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
3970                                    .SBTTL  TEST # 146 - VERIFY CACHE DATA STORE RAM MEMORY IC'S
                                        ;*****************************************************************
                                        ;*TEST 146      VERIFY CACHE DATA STORE RAM MEMORY IC'S
                                        ;*      VERIFY CACHE DATA STORE RAM MEMORY IC'S BY PERFORMING A
                                        ;*      MARCH PATTERN TEST TO LOW CACHE AREA OF DATA STORE(LOC. 0000-3777)
                                        ;*      PROCEDURE:  1. WRITE ALL 0'S TO ALL LO CACHE DATA STORE
                                        ;*                     RAMS CORRESPONDING TO LOCATIONS 0000-3777
                                        ;*                  2. READ 0'S FROM ALL LO CACHE RAMS CORRESPONDING
                                        ;*                     TO LOCATION 0000
                                        ;*                  3. WRITE ALL 1'S TO ALL RAMS CORRESPONDING TO LOCATION
                                        ;*                     0000.
                                        ;*                  4. READ 1'S FROM ALL RAMS CORRESPONDING TO LOCATION
                                        ;*                     0000.
                                        ;*                  5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
                                        ;*                     AND UNTIL LOC. 3777 IS REACHED.
                                        ;*****************************************************************
                                        TST146:
025300
025300  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
025302  025312                                  .WORD   40$             ;TEST START LOCATION
025304  070000                                  .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
025306  000000                                  .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
025310  070100                                  .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
025312  012737  001015  177746  40$:    MOV     #OFF,CCR                ;DISABLE CACHE
025320  004437  002452                   JSR     R4,RELCTH               ;LOCATE TEST CODE TO HIGH CACHE SPACE
025324  025614                           .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

3971 025326  012700  060000      1$:    MOV     #60000,R0               ;ADDRESS LOC. 60000 TO R0
3972 025332  005020              5$:    CLR     (R0)+                   ;CLEAR ALL LOW CACHE MAIN MEMORY
3973 025334  020027  070000             CMP     R0,#70000               ;DONE?
3974 025340  001374                     BNE     5$                      ;NO
3975 025342  012700  060000             MOV     #60000,R0               ;ADDR. LOC. 60000 TO R0
3976 025346  012701  040000             MOV     #40000,R1               ;ADDR. LOC. 40000 TO R1
3977 025352  012702  177777             MOV     #-1,R2                  ;R2 CONTAINS ALL 1'S
3978 025356  112737  000002  177750     MOVB    #HODO,CMR               ;HODO ALLOWS CACHE UPDATES &   DATA STORE BITS
3979                                                                    ;TO BE WRITTEN TO CDR<15:0> ONLY DURING
3980                                                                    ;THE DESTINATION MEMORY ACCESS OF AN
3981                                                                    ;INSTRUCTION
3982 025364  012737  000015  177746     MOV     #15,CCR                 ;WRITE ENABLE CACHE DATA STORES
3983 025372  005721              6$:    TST     (R1)+                   ;UPDATE ALL LOW CACHE DATA STORE WITH 0'S
3984 025374  005720                     TST     (R0)+                   ;
3985 025376  020027  070000             CMP     R0,#70000               ;DONE?
3986 025402  001373                     BNE     6$                      ;NO
3987 025404  012700  060000             MOV     #60000,R0               ;ADDR. 60000 TO R0
3988 025410  005710              7$:    TST     (R0)                    ;READ HIT TO CACHE DATA STORE LOCATION
3989                                                                    ;SPECIFIED BY R0.CLOCK DATA STORE
3990                                                                    ;BITS INTO CDR<15:0>.SHOULD BE ALL 0'S.
3991 025412  013705  177754             MOV     CDR,R5                  ;SAVE CDR CONTENTS
3992 025416  010210                     MOV     R2,(R0)                 ;WRITE HIT CACUSES UPDATE TO CACHE DATA
3993                                                                    ;STORE LOCATION.WRITE ALL 1'S.
3994 025420  005710                     TST     (R0)                    ;READ HIT.CLOCK DATA STORE BITS TO
3995                                                                    ;CDR <15:0>.SHOULD BE ALL 1'S.
3996 025422  013703  177754             MOV     CDR,R3                  ;SAVE CDR CONTENTS
3997 025426  000240              25$:   NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
```

TEST # 146 - VERIFY CACHE DATA STORE RAM MEMORY IC'S

```
        025430  000240                          NOP                     ;FOR  LOOP ON ERROR
 3998   025432  005705                          TST     R5              ;SHOULD BE ALL 0'S
 3999   025434  001424                          BEQ     8$              ;PASS
 4000   025436  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
 4001   025444  105037  177750                  CLRB    CMR             ;CLEAR MAINT. MODE
 4002   025450  005037  050504                  CLR     EXDAT6          ;SPECIFY EXPECTED CACHE DATA STORE DATA
 4003   025454  010537  050502                  MOV     R5,CDR150       ;SPECIFY CACHE DATA STORE DATA READ THRU CDR<15:0>
 4004   025460  010037  050506                  MOV     R0,CA121        ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
 4005   025464  006237  050506                  ASR     CA121
 4006   025470  104413                          ERROR                   ;ERROR
                                                                         ;-----
        025472  025470                          .WORD   .-2
 4007
 4008                                                                    ;DATA STORE MARCH PATTERN TEST
 4009                                                                    ;READING CACHE DATA STORE DATA
 4010                                                                    ;THRU CDR<15:0> DID NOT READ ALL 0'S.
 4011                                                                    ;THIS SUGGESTS THAT A RAM LOCATION
 4012                                                                    ;SPECIFIED BY CA121 WAS OVERWRITTEN
 4013                                                                    ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
 4014                                                                    ;LOCATION.ANY BIT IN CDR150 DATA
 4015                                                                    ;THAT IS A 1 MAY POINT TO A BAD
 4016                                                                    ;CACHE DATA STORE RAM.
 4016   025474  050504                          EXDAT6                  ; EXPECTED CACHE DATA STORE DATA
 4017   025476  050502                          CDR150                  ; CACHE DATA STORE DATA READ
 4018                                                                    ;THRU CDR<15:0>
 4019   025500  050506                          CA121                   ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
 4020   025502  000000                          .WORD   0
 4021   025504  000435                          BR      3$              ;END THE TEST
 4022   025506  022703  177777          8$:     CMP     #-1,R3          ;SHOULD BE ALL 1'S
 4023   025512  001425                          BEQ     9$              ;PASS
 4024   025514  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
 4025   025522  105037  177750                  CLRB    CMR             ;CLEAR MAINT. MODE
 4026   025526  012737  177777  050504          MOV     #-1,EXDAT6      ;SPECIFY EXPECTED CACHE DATA STORE DATA
 4027   025534  010337  050502                  MOV     R3,CDR150       ;SPECIFY CACHE DATA STORE DATA READ
 4028                                                                    ;THRU CDR<15:0>
 4029   025540  010037  050506                  MOV     R0,CA121        ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
 4030   025544  006237  050506                  ASR     CA121
 4031   025550  104413                          ERROR                   ;ERROR
                                                                         ;-----
        025552  025550                          .WORD   .-2
 4032
 4033                                                                    ;DATA STORE MARCH PATTERN TEST
 4034                                                                    ;READING CACHE DATA STORE DATA
 4035                                                                    ;THRU CDR<15:0> DID NOT READ ALL 1'S.
 4036                                                                    ;ANY BIT IN CDR150 DATA
 4037                                                                    ;THAT IS A 0 MAY POINT TO A BAD
 4038                                                                    ;CACHE DATA STORE RAM.
 4039   025554  050504                          EXDAT6                  ; EXPECTED CACHE DATA STORE DATA
 4040   025556  050502                          CDR150                  ; CACHE DATA STORE DATA READ
 4041                                                                    ;THRU CDR<15:0>
 4042   025560  050506                          CA121                   ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
 4043   025562  000000                          .WORD   0
 4044   025564  000405                          BR      3$              ;END TEST
 4045   025566  062700  000002          9$:     ADD     #2,R0           ;NEXT LOCATION
 4046   025572  022700  070000                  CMP     #70000,R0       ;HAS ALL LO CACHE BEEN DONE?
 4047   025576  001304                          BNE     7$              ;NO,CONTINUE
 4048   025600  012737  001015  177746  3$:     MOV     #OFF,CCR        ;DISABLE CACHE
 4049   025606  105037  177750                  CLRB    CMR             ;DISABLE MAINT. MODE
```

TEST # 146 - VERIFY CACHE DATA STORE RAM MEMORY IC'S

```
 4050 025612  000240                  10$:    NOP                     ;END OF TEST
      025614  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
4065                                    .SBTTL  TEST # 147 - VERIFY CACHE DATA STORE RAM MEMORY IC'S
                                        ;;*****************************************************************
                                        ;*TEST 147      VERIFY CACHE DATA STORE RAM MEMORY IC'S
                                        ;*      VERIFY CACHE DATA STORE RAM MEMORY IC'S BY PERFORMING A
                                        ;*      MARCH PATTERN TEST TO HIGH CACHE AREA OF DATA STORE(LOC. 4000-7777)
                                        ;*      PROCEDURE:  1. WRITE ALL 0'S TO ALL HI CACHE DATA STORE
                                        ;*                     RAMS CORRESPONDING TO LOCATIONS 4000-7777
                                        ;*                  2. READ 0'S FROM ALL HI CACHE RAMS CORRESPONDING
                                        ;*                     TO LOCATION 4000
                                        ;*                  3. WRITE ALL 1'S TO ALL RAMS CORRESPONDING TO LOCATION
                                        ;*                     4000.
                                        ;*                  4. READ 1'S FROM ALL RAMS CORRESPONDING TO LOCATION
                                        ;*                     4000.
                                        ;*                  5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
                                        ;*                     AND UNTIL LOC. 7777 IS REACHED.
                                        ;;*****************************************************************
                                        TST147:
025620
025620  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
025622  025632                                  .WORD   40$             ;TEST START LOCATION
025624  060000                                  .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
025626  000000                                  .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
025630  060100                                  .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
025632  012737  001015  177746  40$:    MOV     #OFF,CCR                ;DISABLE CACHE
025640  004437  002424                   JSR     R4,RELCTL               ;LOCATE TEST CODE TO LOW CACHE SPACE
025644  026134                          .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

4066 025646  012700  070000      1$:    MOV     #70000,R0               ;ADDRESS LOC. 70000 TO R0
4067 025652  005020              5$:    CLR     (R0)+                   ;CLEAR ALL HIGH CACHE MAIN MEMORY
4068 025654  020027  100000             CMP     R0,#100000              ;DONE?
4069 025660  001374                     BNE     5$                      ;NO
4070 025662  012700  070000             MOV     #70000,R0               ;ADDR. LOC. 70000 TO R0
4071 025666  012701  050000             MOV     #50000,R1               ;ADDR. LOC. 50000 TO R1
4072 025672  012702  177777             MOV     #-1,R2                  ;R2 CONTAINS ALL 1'S
4073 025676  112737  000002  177750     MOVB    #HODO,CMR               ;HODO ALLOWS CACHE UPDATES &   DATA STORE BITS
4074                                                                    ;TO BE WRITTEN TO CDR<15:0> ONLY DURING
4075                                                                    ;THE DESTINATION MEMORY ACCESS OF AN
4076                                                                    ;INSTRUCTION
4077 025704  012737  000015  177746     MOV     #15,CCR                 ;WRITE ENABLE CACHE DATA STORES
4078 025712  005721              6$:    TST     (R1)+                   ;UPDATE ALL HIGH CACHE DATA STORE WITH 0'S
4079 025714  005720                     TST     (R0)+                   ;
4080 025716  020027  100000             CMP     R0,#100000              ;DONE?
4081 025722  001373                     BNE     6$                      ;NO
4082 025724  012700  070000             MOV     #70000,R0               ;ADDR. 70000 TO R0
4083 025730  005710              7$:    TST     (R0)                    ;READ HIT TO CACHE DATA STORE LOCATION
4084                                                                    ;SPECIFIED BY R0.CLOCK DATA STORE
4085                                                                    ;BITS INTO CDR<15:0>.SHOULD BE ALL 0'S.
4086 025732  013705  177754             MOV     CDR,R5                  ;SAVE CDR CONTENTS
4087 025736  010210                     MOV     R2,(R0)                 ;WRITE HIT CACUSES UPDATE TO CACHE DATA
4088                                                                    ;STORE LOCATION.WRITE ALL 1'S.
4089 025740  005710                     TST     (R0)                    ;READ HIT.CHICK DATA STORE BITS TO
4090                                                                    ;CDR <15:0>.SHOULD BE ALL 1'S.
4091 025742  013703  177754             MOV     CDR,R3                  ;SAVE CDR CONTENTS
4092 025746  000240              25$:   NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
```

```
      025750  000240                          NOP                     ;FOR  LOOP ON ERROR
 4093 025752  005705                          TST     R5              ;SHOULD BE ALL 0'S
 4094 025754  001424                          BEQ     8$              ;PASS
 4095 025756  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
 4096 025764  105037  177750                  CLRB    CMR             ;CLEAR MAINT. MODE
 4097 025770  005037  050504                  CLR     EXDAT6          ;SPECIFY EXPECTED CACHE DATA STORE DATA
 4098 025774  010537  050502                  MOV     R5,CDR150       ;SPECIFY CACHE DATA STORE DATA READ
 4099                                                                 ;THRU CDR<15:0>
 4100 026000  010037  050506                  MOV     R0,CA121        ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
 4101 026004  006237  050506                  ASR     CA121
 4102 026010  104413                          ERROR                   ;ERROR
                                                                      ;-----
      026012  026010                          .WORD   .-2
 4103                                                                 ;DATA STORE MARCH PATTERN TEST
 4104                                                                 ;READING CACHE DATA STORE DATA
 4105                                                                 ;THRU CDR<15:0> DID NOT READ ALL 0'S.
 4106                                                                 ;THIS SUGGESTS THAT A RAM LOCATION
 4107                                                                 ;SPECIFIED BY CA121 WAS OVERWRITTEN
 4108                                                                 ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
 4109                                                                 ;LOCATION.ANY BIT IN CDR150 DATA
 4110                                                                 ;THAT IS A 1 MAY POINT TO A BAD
 4111                                                                 ;CACHE DATA STORE RAM.
 4112
 4113 026014  050504                          EXDAT6                  ; EXPECTED CACHE DATA STORE DATA
 4114 026016  050502                          CDR150                  ; CACHE DATA STORE DATA READ
 4115                                                                 ;THRU CDR<15:0>
 4116 026020  050506                          CA121                   ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
 4117 026022  000000                          .WORD   0
 4118 026024  000435                          BR      3$              ;END THE TEST
 4119 026026  022703  177777          8$:     CMP     #-1,R3          ;SHOULD BE ALL 1'S
 4120 026032  001425                          BEQ     9$              ;PASS
 4121 026034  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
 4122 026042  105037  177750                  CLRB    CMR             ;CLEAR MAINT. MODE
 4123 026046  012737  177777  050504          MOV     #-1,EXDAT6      ;SPECIFY EXPECTED CACHE DATA STORE DATA
 4124 026054  010337  050502                  MOV     R3,CDR150       ;SPECIFY CACHE DATA STORE DATA READ
 4125                                                                 ;THRU CDR<15:0>
 4126 026060  010037  050506                  MOV     R0,CA121        ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
 4127 026064  006237  050506                  ASR     CA121
 4128 026070  104413                          ERROR                   ;ERROR
                                                                      ;-----
      026072  026070                          .WORD   .-2
 4129                                                                 ;DATA STORE MARCH PATTERN TEST
 4130                                                                 ;READING CACHE DATA STORE DATA
 4131                                                                 ;THRU CDR<15:0> DID NOT READ ALL 1'S.
 4132                                                                 ;ANY BIT IN CDR150 DATA
 4133                                                                 ;THAT IS A 0 MAY POINT TO A BAD
 4134                                                                 ;CACHE DATA STORE RAM.
 4135
 4136 026074  050504                          EXDAT6                  ; EXPECTED CACHE DATA STORE DATA
 4137 026076  050502                          CDR150                  ; CACHE DATA STORE DATA READ
 4138                                                                 ;THRU CDR<15:0>
 4139 026100  050506                          CA121                   ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
 4140 026102  000000                          .WORD   0
 4141 026104  000405                          BR      3$              ;END TEST
 4142 026106  062700  000002          9$:     ADD     #2,R0           ;NEXT LOCATION
 4143 026112  022700  100000                  CMP     #100000,R0      ;HAS ALL HI CACHE BEEN DONE?
 4144 026116  001304                          BNE     7$              ;NO,CONTINUE
```

TEST # 147 - VERIFY CACHE DATA STORE RAM MEMORY IC'S

```
 4145 026120  012737  001015  177746  3$:     MOV     #OFF,CCR        ;DISABLE CACHE
 4146 026126  105037  177750                  CLRB    CMR             ;DISABLE MAINT. MODE
 4147 026132  000240                  10$:    NOP                     ;END OF TEST
      026134  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
4162                                    .SBTTL  TEST # 150 - VERIFY CACHE TAG STORE RAM MEMORY IC'S
                                        ;;*****************************************************************
                                        ;*TEST 150      VERIFY CACHE TAG STORE RAM MEMORY IC'S
                                        ;*      VERIFY CACHE TAG STORE RAM MEMORY IC'S BY PERFORMING A
                                        ;*      MARCH PATTERN TEST TO LOW CACHE AREA OF TAG STORE(LOC. 0000-3777)
                                        ;*      PROCEDURE:  1. WRITE ALL 0'S TO ALL LO CACHE TAG STORE
                                        ;*                     RAMS CORRESPONDING TO LOCATIONS 0000-3777
                                        ;*                  2. READ 0'S FROM ALL LO CACHE RAMS CORRESPONDING
                                        ;*                     TO LOCATION 0000
                                        ;*                  3. WRITE ALL 1'S TO ALL RAMS CORRESPONDING TO LOCATION
                                        ;*                     0000.
                                        ;*                  4. READ 1'S FROM ALL RAMS CORRESPONDING TO LOCATION
                                        ;*                     0000.
                                        ;*                  5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
                                        ;*                     AND UNTIL LOC. 3777 IS REACHED.
                                        ;;*****************************************************************
026140                                  TST150:
026140  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
026142  026152                                  .WORD   40$             ;TEST START LOCATION
026144  070000                                  .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
026146  000000                                  .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
026150  070070                                  .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
026152  012737  001015  177746  40$:    MOV     #OFF,CCR                ;DISABLE CACHE
026160  004437  002452                  JSR     R4,RELCTH               ;LOCATE TEST CODE TO HIGH CACHE SPACE
026164  026530                          .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

4163 026166  005037  177752     1$:     CLR     CHR                     ;LOAD AMR<8:0> BY WRITING ALL 0'S TO CHR<8:0>
4164 026172  012700  060000             MOV     #60000,R0               ;ADDR. LOC. 60000 TO R0
4165 026176  012701  040000             MOV     #40000,R1               ;ADDR. LOC. 40000 TO R1
4166 026202  112737  000003  177750     MOVB    #HODO+TDAR,CMR          ;HODO ALLOWS CACHE UPDATES &   TAG STORE BITS
4167                                                                    ;TO BE WRITTEN TO CHR<15:7> ONLY DURING
4168                                                                    ;THE DESTINATION MEMORY ACCESS OF AN INSTRUCTION
4169                                                                    ;TDAR ALLOWS TAG FIELD TO BE WRITTEN INTO FROM AMR<8:0>
4170 026210  012737  000015  177746             MOV     #15,CCR         ;WRITE ENABLE CACHE TAG STORES
4171 026216  005721                     6$:     TST     (R1)+           ;WRITE ALL LOW CACHE TAG STORE WITH 0'S
4172 026220  005720                             TST     (R0)+           ;
4173 026222  020027  070000                     CMP     R0,#70000       ;DONE?
4174 026226  001373                             BNE     6$              ;NO
4175 026230  012737  177777  177752             MOV     #-1,CHR         ;LOAD AMR<8:0> BY WRITING TO CHR<8:0>
4176 026236  012700  060000             MOV     #60000,R0               ;ADDR. 60000 TO R0
4177 026242  005710                     7$:     TST     (R0)            ;READ MISS TO CACHE TAG STORE LOCATION
4178                                                                    ;SPECIFIED BY R0.CLOCK TAG STORE
4179                                                                    ;BITS INTO CHR<15:7>.SHOULD BE ALL 0'S.
4180                                                                    ;ALSO CAUSES TAG STORE LOCATION TO BE
4181                                                                    ;WRITTEN WITH 1'S FROM AMR<8:0>
4182 026244  013705  177752             MOV     CHR,R5                  ;SAVE CHR CONTENTS
4183 026250  005710                             TST     (R0)            ;READ MISS.CLOCK TAG STORE BITS TO
4184                                                                    ;CHR <15:0>.SHOULD BE ALL 1'S.
4185 026252  013703  177752             MOV     CHR,R3                  ;SAVE CHR CONTENTS
4186 026256  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     026260  000240                             NOP                     ;FOR  LOOP ON ERROR
4187 026262  042705  000177             BIC     #177,R5
4188 026266  005705                             TST     R5              ;SHOULD BE ALL 0'S
```

```
4189 026270  001437                        BEQ     8$                ;PASS
4190 026272  012737  001015  177746        MOV     #OFF,CCR          ;DISABLE CACHE
4191 026300  105037  177750                CLRB    CMR               ;CLEAR MAINT. MODE
4192 026304  005037  050522                CLR     EXDAT3            ;SPECIFY EXPECTED CACHE TAG STORE DATA
4193 026310  010537  050474                MOV     R5,CHR157         ;SPECIFY CACHE TAG STORE TAG READ
4194                                                                  ;THRU CHR<15:7>
4195 026314  012737  000007  002062        MOV     #7,LOOP           ;PREPARE CHR157 FOR TYPEOUT
4196 026322  006237  050474          4$:   ASR     CHR157
4197 026326  042737  100000  050474        BIC     #100000,CHR157
4198 026334  005337  002062                DEC     LOOP
4199 026340  001370                        BNE     4$
4200 026342  010037  050506                MOV     R0,CA121          ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
4201 026346  006237  050506                ASR     CA121
4202 026352  104413                        ERROR                     ;ERROR
                                                                      ;-----
     026354  026352                        .WORD   .-2
4203                                                                  ;TAG STORE MARCH PATTERN TEST
4204                                                                  ;READING CACHE TAG STORE DATA
4205                                                                  ;THRU CHR<15:7> DID NOT READ ALL 0'S.
4206                                                                  ;THIS SUGGESTS THAT A RAM LOCATION
4207                                                                  ;SPECIFIED BY CA121 WAS OVERWRITTEN
4208                                                                  ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
4209                                                                  ;LOCATION.ANY BIT IN CHR157 DATA
4210                                                                  ;THAT IS A 1 MAY POINT TO A BAD
4211                                                                  ;CACHE TAG STORE RAM.
4212
4213 026356  050522                        EXDAT3                    ; EXPECTED CACHE TAG STORE DATA
4214 026360  050474                        CHR157                    ; CACHE TAG STORE DATA READ
4215                                                                  ;THRU CHR<15:7>
4216 026362  050506                        CA121                     ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
4217 026364  000000                        .WORD   0
4218 026366  000452                        BR      3$                ;END THE TEST
4219 026370  042703  000177          8$:   BIC     #177,R3           ;PREPARE R3 FOR CHECK
4220 026374  022703  177600                CMP     #177600,R3        ;SHOULD BE ALL 1'S
4221 026400  001440                        BEQ     9$                ;PASS
4222 026402  012737  001015  177746        MOV     #OFF,CCR          ;DISABLE CACHE
4223 026410  105037  177750                CLRB    CMR               ;CLEAR MAINT. MODE
4224 026414  012737  177777  050522        MOV     #-1,EXDAT3        ;SPECIFY EXPECTED CACHE TAG STORE DATA
4225 026422  010337  050474                MOV     R3,CHR157         ;SPECIFY CACHE TAG STORE DATA READ THRU CHR<15:7>
4226 026426  012737  000007  002062        MOV     #7,LOOP           ;PREPARE CHR157 FOR TYPEOUT
4227 026434  006237  050474          5$:   ASR     CHR157
4228 026440  042737  100000  050474        BIC     #100000,CHR157
4229 026446  005337  002062                DEC     LOOP
4230 026452  001370                        BNE     5$
4231 026454  010037  050506                MOV     R0,CA121          ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
4232 026460  006237  050506                ASR     CA121
4233 026464  104413                        ERROR                     ;ERROR
                                                                      ;-----
     026466  026464                        .WORD   .-2
4234                                                                  ;TAG STORE MARCH PATTERN TEST
4235                                                                  ;READING CACHE TAG STORE DATA
4236                                                                  ;THRU CHR<15:7> DID NOT READ ALL 15'S.
4237                                                                  ;ANY BIT IN CHR157 DATA
4238                                                                  ;THAT IS A 0 MAY POINT TO A BAD
4239                                                                  ;CACHE TAG STORE RAM.
4240
4241 026470  050522                        EXDAT3                    ; EXPECTED CACHE TAG STORE DATA
```

```
4242                                                                    ; CACHE TAG STORE DATA READ
4243                                                                    ;THRU CHR<15:7>
4244 026472  050474                        CHR157                       ;CACHE TAG STORE READ THRU CHR<15:7>
4245 026474  050506                        CA121                        ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
4246 026476  000000                        .WORD   0
4247 026500  000405                        BR      3$                   ;END TEST
4248 026502  062700  000002          9$:   ADD     #2,R0                ;NEXT LOCATION
4249 026506  022700  070000                CMP     #70000,R0            ;HAS ALL LO CACHE BEEN DONE?
4250 026512  001253                        BNE     7$                   ;NO,CONTINUE
4251 026514  012737  001015  177746  3$:   MOV     #0FF,CCR             ;DISABLE CACHE
4252 026522  105037  177750                CLRB    CMR                  ;DISABLE MAINT. MODE
4253 026526  000240                 10$:   NOP                          ;END OF TEST
     026530  005237  001472                INC     $TESTN               ;INCREMENT TEST COUNTER
```

```
4268                                    .SBTTL  TEST # 151 - VERIFY CACHE TAG STORE RAM MEMORY IC'S
                                        ;;*****************************************************************
                                        ;*TEST 151      VERIFY CACHE TAG STORE RAM MEMORY IC'S
                                        ;*      VERIFY CACHE TAG STORE RAM MEMORY IC'S BY PERFORMING A
                                        ;*      MARCH PATTERN TEST TO HIGH CACHE AREA OF TAG STORE(LOC. 4000-7777)
                                        ;*      PROCEDURE:  1. WRITE ALL 0'S TO ALL HI CACHE TAG STORE
                                        ;*                     RAMS CORRESPONDING TO LOCATIONS 4000-7777
                                        ;*                  2. READ 0'S FROM ALL HI CACHE RAMS CORRESPONDING
                                        ;*                     TO LOCATION 4000
                                        ;*                  3. WRITE ALL 1'S TO ALL RAMS CORRESPONDING TO LOCATION
                                        ;*                     4000.
                                        ;*                  4. READ 1'S FROM ALL RAMS CORRESPONDING TO LOCATION
                                        ;*                     4000.
                                        ;*                  5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
                                        ;*                     AND UNTIL LOC. 7777 IS REACHED.
                                        ;;*****************************************************************
     026534                             TST151:
     026534  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     026536  026546                             .WORD   40$             ;TEST START LOCATION
     026540  060000                             .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
     026542  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     026544  060070                             .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
     026546  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     026554  004437  002424                     JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
     026560  027124                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

4269 026562  005037  177752             1$:     CLR     CHR             ;LOAD AMR<8:0> BY WRITING ALL 0'S TO CHR<8:0>
4270 026566  012700  070000                     MOV     #70000,R0       ;ADDR. LOC. 70000 TO R0
4271 026572  012701  050000                     MOV     #50000,R1       ;ADDR. LOC. 50000 TO R1
4272 026576  112737  000003  177750             MOVB    #HODO+TDAR,CMR  ;HODO ALLOWS CACHE UPDATES &   TAG STORE BITS
4273                                                                    ;TO BE WRITTEN TO CHR<15:7> ONLY DURING
4274                                                                    ;THE DESTINATION MEMORY ACCESS OF AN INSTRUCTION
4275                                                                    ;TDAR ALLOWS TAG FIELD TO BE WRITTEN INTO FROM AMR<8:0>
4276 026604  012737  000015  177746             MOV     #15,CCR         ;WRITE ENABLE CACJE TAG STORES
4277 026612  005721                     6$:     TST     (R1)+           ;WRITE ALL HIGH CACHE TAG STORE WITH 0'S
4278 026614  005720                             TST     (R0)+           ;
4279 026616  020027  100000                     CMP     R0,#100000      ;DONE?
4280 026622  001373                             BNE     6$              ;NO
4281 026624  012737  177777  177752             MOV     #-1,CHR         ;LOAD AMR<8:0> BY WRITING TO CHR<8:0>
4282 026632  012700  070000                     MOV     #70000,R0       ;ADDR. 70000 TO R0
4283 026636  005710                     7$:     TST     (R0)            ;READ MISS TO CACHE TAG STORE LOCATION
4284                                                                    ;SPECIFIED BY R0.CLOCK TAG STORE
4285                                                                    ;BITS INTO CHR<15:7>.SHOULD BE ALL 0'S.
4286                                                                    ;ALSO CAUSES TAG STORE LOCATION TO BE
4287                                                                    ;WRITTEN WITH 1'S FROM AMR<8:0>
4288 026640  013705  177752                     MOV     CHR,R5          ;SAVE CHR CONTENTS
4289 026644  005710                             TST     (R0)            ;READ MISS.CLOCK TAG STORE BITS TO
4290                                                                    ;CHR <15:7>.SHOULD BE ALL 1'S.
4291 026646  013703  177752                     MOV     CHR,R3          ;SAVE CHR CONTENTS
4292 026652  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     026654  000240                             NOP                     ;FOR  LOOP ON ERROR
4293 026656  042705  000177                     BIC     #177,R5
4294 026662  005705                             TST     R5              ;SHOULD BE ALL 0'S
```

```
4295 026664  001437                        BEQ     8$              ;PASS
4296 026666  012737  001015  177746        MOV     #OFF,CCR        ;DISABLE CACHE
4297 026674  105037  177750                CLRB    CMR             ;CLEAR MAINT. MODE
4298 026700  005037  050522                CLR     EXDAT3          ;SPECIFY EXPECTED CACHE TAG STORE DATA
4299 026704  010537  050474                MOV     R5,CHR157       ;SPECIFY CACHE TAG STORE TAG READ
4300                                                               ;THRU CHR<15:7>
4301 026710  012737  000007  002062        MOV     #7,LOOP         ;PREPARE CHR157 FOR TYPEOUT
4302 026716  006237  050474          4$:   ASR     CHR157
4303 026722  042737  100000  050474        BIC     #100000,CHR157
4304 026730  005337  002062                DEC     LOOP
4305 026734  001370                        BNE     4$
4306 026736  010037  050506                MOV     R0,CA121        ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
4307 026742  006237  050506                ASR     CA121
4308 026746  104413                        ERROR                   ;ERROR
                                                                   ;-----
     026750  026746                        .WORD   .-2
4309                                                               ;TAG STORE MARCH PATTERN TEST
4310                                                               ;READING CACHE TAG STORE DATA
4311                                                               ;THRU CHR<15:7> DID NOT READ ALL 0'S.
4312                                                               ;THIS SUGGESTS THAT A RAM LOCATION
4313                                                               ;SPECIFIED BY CA121 WAS OVERWRITTEN
4314                                                               ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
4315                                                               ;LOCATION.ANY BIT IN CHR157 DATA
4316                                                               ;THAT IS A 1 MAY POINT TO A BAD
4317                                                               ;CACHE TAG STORE RAM.
4318
4319 026752  050522                        EXDAT3                  ; EXPECTED CACHE TAG STORE DATA
4320 026754  050474                        CHR157                  ; CACHE TAG STORE DATA READ
4321                                                               ;THRU CHR<15:7>
4322 026756  050506                        CA121                   ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
4323 026760  000000                        .WORD   0
4324 026762  000452                        BR      3$              ;END THE TEST
4325 026764  042703  000177          8$:   BIC     #177,R3         ;PREPARE R3 FOR CHECK
4326 026770  022703  177600                CMP     #177600,R3      ;SHOULD BE ALL 1'S
4327 026774  001440                        BEQ     9$              ;PASS
4328 026776  012737  001015  177746        MOV     #OFF,CCR        ;DISABLE CACHE
4329 027004  105037  177750                CLRB    CMR             ;CLEAR MAINT. MODE
4330 027010  012737  177777  050522        MOV     #-1,EXDAT3      ;SPECIFY EXPECTED CACHE TAG STORE DATA
4331 027016  010337  050474                MOV     R3,CHR157       ;SPECIFY CACHE TAG STORE DATA READ THRU CHR<15:7>
4332 027022  012737  000007  002062        MOV     #7,LOOP         ;PREPARE CHR157 FOR TYPEOUT
4333 027030  006237  050474          5$:   ASR     CHR157
4334 027034  042737  100000  050474        BIC     #100000,CHR157
4335 027042  005337  002062                DEC     LOOP
4336 027046  001370                        BNE     5$
4337 027050  010037  050506                MOV     R0,CA121        ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
4338 027054  006237  050506                ASR     CA121
4339 027060  104413                        ERROR                   ;ERROR
                                                                   ;-----
     027062  027060                        .WORD   .-2
4340                                                               ;TAG STORE MARCH PATTERN TEST
4341                                                               ;READING CACHE TAG STORE DATA
4342                                                               ;THRU CHR<15:7> DID NOT READ ALL 15'S.
4343                                                               ;ANY BIT IN CHR157 DATA
4344                                                               ;THAT IS A 0 MAY POINT TO A BAD
4345                                                               ;CACHE TAG STORE RAM.
4346
4347 027064  050522                        EXDAT3                  ; EXPECTED CACHE TAG STORE DATA
```

```
4348                                                                    ; CACHE TAG STORE DATA READ
4349                                                                    ;THRU CHR<15:7>
4350 027066  050474                        CHR157                       ;CACHE TAG STORE READ THRU CHR<15:7>
4351 027070  050506                        CA121                        ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
4352 027072  000000                        .WORD   0
4353 027074  000405                        BR      3$                   ;END TEST
4354 027076  062700  000002          9$:   ADD     #2,R0                ;NEXT LOCATION
4355 027102  022700  100000                CMP     #100000,R0           ;HAS ALL HI CACHE BEEN DONE?
4356 027106  001253                        BNE     7$                   ;NO,CONTINUE
4357 027110  012737  001015  177746  3$:   MOV     #OFF,CCR             ;DISABLE CACHE
4358 027116  105037  177750                CLRB    CMR                  ;DISABLE MAINT. MODE
4359 027122  000240                  10$:  NOP                          ;END OF TEST
     027124  005237  001472                INC     $TESTN               ;INCREMENT TEST COUNTER
```

TEST # 152 - VERIFY THAT BYTE DATA PARITY STORES CAN HOLD A 0

```
4375                                    .SBTTL  TEST # 152 - VERIFY THAT BYTE DATA PARITY STORES CAN HOLD A 0
                                        ;;*****************************************************************
                                        ;*TEST 152      VERIFY THAT BYTE DATA PARITY STORES CAN HOLD A 0
                                        ;*      VERIFY THAT LOW AND HI BYTE DATA PARITY STORES CAN HOLD A 0 AT DATA
                                        ;*      PARITY STORE LOCATION 0000.
                                        ;*      PROCEDURE: GENERATE 0'S FROM UPPER AND LOWER BYTE PARITY
                                        ;*                 DATA GENERATORS BY PLACING ALL 0'S ON INPUTS.
                                        ;*                 ZERO'S WILL THEN BE WRITTEN INTO DATA PARITY STORE
                                        ;*                 LOCATION 0000.READ DATA PARITY STORE BITS FROM
                                        ;*                 CMR<11:10>
                                        ;*               CONDITIONS:INPUTS TO DATA PARITY GEN:
                                        ;*                  WRTD<15:0> ALL 0'S
                                        ;*                  WWPD(1)= 0
                                        ;*                 DATA PARITY STORE ADDRESS:
                                        ;*                  CA<12:1>=0000
                                        ;*               RESULT:     CMR<11:10> BOTH 0
                                        ;;*****************************************************************
     027130                             TST152:
     027130  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     027132  027142                             .WORD   40$             ;TEST START LOCATION
     027134  070004                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     027136  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     027140  070040                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     027142  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     027150  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     027154  027266                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

4376 027156  005037  060000  177750  1$:       CLR     60000           ;0'S TO MAIN MEMORY LOCATION
4377 027162  112737  000002                     MOVB    #HODO,CMR       ;ALLOWS UPPER AND LOWER BYTE DATA
4378                                                                    ;PARITY STORE BITS TO BE WRITTEN TO
4379                                                                    ;CMR<11:10> ONLY DURING THE  DESTINATION
4380                                                                    ;ACCESS OF AN INSTRUCTION.
4381 027170  012737  000015  177746             MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE PARITY STORE
4382 027176  005737  040000                     TST     40000           ;
4383 027202  005737  060000                     TST     60000           ;PLACE ALL 0'S ON WRTD<15:0> INPUTS
4384                                                                    ;THEREBY WRITING 0 INTO PARITY STORE LOCATION 0000.
4385 027206  005737  060000                     TST     60000           ;WRITE UPPER AND LOWER DATA PARITY BITS FROM
4386                                                                    ;LOCAT. 0000 INTO CMR<11:10> RESPECTIVELY.
4387 027212  013701  177750                     MOV     CMR,R1          ;SAVE CMR DATA
4388 027216  000240                25$:        NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     027220  000240                            NOP                     ;FOR  LOOP ON ERROR
4389 027222  105037  177750                     CLRB    CMR             ;DISABLE MAINT. MODE
4390 027226  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
4391 027234  032701  004000                     BIT     #HPB,R1         ;CHECK FOR 0
4392 027240  001403                             BEQ     9$              ;PASS
4393 027242  104413                             ERROR                   ;ERROR
                                                                        ;-----
     027244  027242                             .WORD   .-2
4394                                                                    ;DATA PARITY GEN. & STORE TESTS
4395                                                                    ;READING CACHE MAINT. REGISTER
4396                                                                    ;BIT 11 FOR UPPER BYTE PARITY DATA DID
4397                                                                    ;NOT RESULT IN 0.
4398 027246  000000                             .WORD   0
```

TEST # 152 - VERIFY THAT BYTE DATA PARITY STORES CAN HOLD A 0

```
4399 027250  032701  002000        9$:   BIT     #LPB,R1         ;CHECK 0 FOR LOWER BYTE PARITY DATA
4400 027254  001403                     BEQ     10$             ;PASS
4401 027256  104413                     ERROR                   ;ERROR
                                        ;-----
     027260  027256                     .WORD   .-2
4402                                    ;DAT. PARITY GEN. $ STORE TESTS
4403                                    ;READING CACHE MAINT. REGISTER
4404                                    ;BIT 10 FOR LOWER BYTE PARITY DATA DID
4405                                    ;NOT RESULT IN 0.
4406 027262  000000                     .WORD   0
4407 027264  000240              10$:   NOP                     ;END OF TEST
     027266  005237  001472             INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 153 - CHK THAT LOW BYTE DATA PARITY GEN WRITES A 1
                                ;;*****************************************************************
                                ;*TEST 153      CHK THAT LOW BYTE DATA PARITY GEN WRITES A 1
                                ;*      VERIFY THAT THE LOW BYTE DATA PARITY GENERATOR WILL WRITE A 1 INTO  ADDRESS LOCATION
                                ;*      0000 FOR FLOATING 1 ACROSS 0 DATA PATTERN ON DATA PARITY GENERATOR INPUTS.
                                ;*      PROCEDURE: FOR EACH FLOATING 1 PATTERN READ DATA PARITY STORE BITS
                                ;*                 FROM CMR<11:10>
                                ;*      CONDITIONS:
                                ;*              INPUTS TO DATA PARITY GEN.:
                                ;*                   WRTD<7:0> FLOATING 1 ACROSS 0'S
                                ;*                   WRTD<15:8> ALL 0'S
                                ;*                   WWPD(1)=0
                                ;*                DATA PARITY STORE ADDRESS:
                                ;*                   CA<12:1>=0000
                                ;*      RESULT: CMR<11>=0
                                ;*              CMR<10>=1
                                ;;*****************************************************************
     027272                     TST153:
     027272  000004                     SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
     027274  027304                     .WORD   40$             ;TEST START LOCATION
     027276  070014                     .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     027300  000000                     .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     027302  070050                     .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     027304  012737  001015  177746 40$: MOV     #OFF,CCR        ;DISABLE CACHE
     027312  004437  002452             JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     027316  027460                     .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE

4424 027320  012737  000001  050516      MOV     #1,FLTPAT       ;1ST FLOATING 1 PATTERN:000001
4425 027326  013737  050516  060000 2$:  MOV     FLTPAT,60000    ;FLOATING PATTERN TO MAIN MEMORY
4426 027334  112737  000002  177750 1$:  MOVB    #HODD,CMR       ;ALLOWS UPPER AND LOWER BYTE DATA
4427                                                            ;PARITY STORE BITS TO BE WRITTEN TO
4428                                                            ;CMR<11:10> ONLY DURING THE  DESTINATION
4429                                                            ;ACCESS OF AN INSTRUCTION.
4430 027342  012737  000015  177746      MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE PARITY
4431                                                            ;STORE
4432 027350  005737  040000             TST     40000           ;
4433 027354  005737  060000             TST     60000           ;PLACE FLOATING 1 PATTERN ON WRTD<15:0> INPUTS
4434                                                            ;THEREBY WRITING  1 IN LOW BYTE AND 0 IN HI
4435                                                            ;BYTE DATA PARITY STORE LOCATION 0000.
4436 027360  005737  060000             TST     60000           ;WRITE UPPER AND LOWER BYTE DATA PARITY BITS FROM
4437                                                            ;LOCAT. 0000 INTO CMR<11:10> RESPECTIVELY.
4438 027364  013701  177750             MOV     CMR,R1          ;SAVE CMR DATA
4439 027370  000240             25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     027372  000240                     NOP                     ;FOR  LOOP ON ERROR
4440 027374  105037  177750             CLRB    CMR             ;DISABLE MAINT. MODE
4441 027400  012737  001015  177746      MOV     #OFF,CCR        ;DISABLE CACHE
4442 027406  032701  004000             BIT     #HPB,R1         ;CHECK  0 FOR UPPER BYTE PARITY STORE
4443 027412  001404                     BEQ     8$              ;PASS
4444 027414  104413                     ERROR                   ;ERROR
                                                                ;-----
     027416  027414                     .WORD   .-2
4445                                                            ;DATA PARITY GEN. & STORE TESTS
4446                                                            ;READING CACHE MAINT. REGISTER
```

TEST # 153 - CHK THAT LOW BYTE DATA PARITY GEN WRITES A 1

```
4447                                                        ;BIT 11 FOR UPPER BYTE PARITY DATA DID
4448                                                        ;NOT RESULT IN 0.
4449 027420  050516                    FLTPAT               ;PRINT FLOATING 1 PATTERN USED FOR DATA PARITY
4450                                                        ;GENERATOR INPUTS: WRTD<15:0>
4451 027422  000000                    .WORD   0
4452 027424  032701  002000      8$:   BIT     #LPB,R1       ;CHECK 1 FOR LOWER BYTE PARITY DATA
4453 027430  001004                    BNE     9$            ;PASS
4454 027432  104413                    ERROR                 ;ERROR
                                                            ;-----
     027434  027432                    .WORD   .-2
4455                                                        ;DAT. PARITY GEN. $ STORE TESTS
4456                                                        ;READING CACHE MAINT. REGISTER
4457                                                        ;BIT 10 FOR LOWER BYTE PARITY DATA DID
4458                                                        ;NOT RESULT IN 1.
4459 027436  050516                    FLTPAT               ;PRINT FLOATING 1 PATTERN USED FOR DATA PARITY
4460                                                        ;GEN. INPUT: WRTD<15:0>
4461 027440  000000                    .WORD   0
4462 027442  006337  050516      9$:   ASL     FLTPAT        ;NEXT PATTREN
4463 027446  032737  000400  050516    BIT     #400,FLTPAT   ;HAS PATTERN 000200 BEEN DONE
4464 027454  001724                    BEQ     2$            ;NO
4465 027456  000240              10$:  NOP                   ;END OF TEST
     027460  005237  001472            INC     $TESTN        ;INCREMENT TEST COUNTER
```

```
4481                                    .SBTTL  TEST # 154 - CHK THAT HI BYTE DATA PARITY GEN WRITES A 1
                                        ;;*****************************************************************
                                        ;*TEST 154      CHK THAT HI BYTE DATA PARITY GEN WRITES A 1
                                        ;*      VERIFY THAT THE HI BYTE DATA PARITY GENERATOR WILL WRITE A 1 INTO  ADDRESS LOCATION
                                        ;*      FOR FLOATING 1 ACROSS 0 DATA PATTERN ON DATA PARITY GENERATOR INPUTS.
                                        ;*      PROCEDURE: FOR EACH FLOATING 1 PATTERN READ DATA PARITY STORE BITS
                                        ;*                 FROM CMR<11:10>
                                        ;*               CONDITIONS:
                                        ;*               INPUTS TO DATA PARITY GEN.:
                                        ;*                    WRTD<7:0> ALL 0'S
                                        ;*                    WRTD<15:8> FLOATING 1 PATTERN
                                        ;*                    WWPD(1)=0
                                        ;*                 DATA PARITY STORE ADDRESS:
                                        ;*                    CA<12:1>=0000
                                        ;*               RESULT: CMR<11>=1
                                        ;*               CMR<10>=0
                                        ;;*****************************************************************
027464                                  TST154:
027464  000004                                  SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                ;ERROR/LOOP ON TEST
027466  027476                                  .WORD   40$                     ;TEST START LOCATION
027470  070014                                  .WORD   1$-40$+67764            ;LOOP ON ERROR START LOCATION
027472  000000                                  .WORD   0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
027474  070050                                  .WORD   25$-40$+67764           ;LOOP ON ERROR END LOCATION
027476  012737  001015  177746  40$:    MOV     #OFF,CCR                        ;DISABLE CACHE
027504  004437  002452                   JSR     R4,RELCTH                       ;LOCATE TEST CODE TO HIGH CACHE SPACE
027510  027644                                  .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

4482 027512  012737  000400  050516           MOV     #400,FLTPAT             ;1ST FLOATING 1 PATTERN:000400
4483 027520  013737  050516  060000  2$:      MOV     FLTPAT,60000            ;FLOATING PATTERN TO MAIN MEMORY
4484 027526  112737  000002  177750  1$:      MOVB    #HODO,CMR               ;ALLOWS UPPER AND LOWER BYTE DATA
4485                                                                         ;PARITY STORE BITS TO BE WRITTEN TO
4486                                                                         ;CMR<11:10> ONLY DURING THE  DESTINATION
4487                                                                         ;ACCESS OF AN INSTRUCTION.
4488 027534  012737  000015  177746           MOV     #15,CCR                 ;NO UCB SO AS TO WRITE ENABLE PARITY STORE
4489 027542  005737  040000                   TST     40000                   ;
4490 027546  005737  060000                   TST     60000                   ;PLACE FLOATING 1 PATTERN ON WRTD<15:0> INPUTS
4491                                                                         ;THEREBY WRITING  0 IN LOW BYTE AND 1 IN HI
4492                                                                         ;BYTE DATA PARITY STORE LOCATION 0000.
0004[illegible]  027552  005737  060000           TST     60000           ;WRITE UPPER AND LOWER BYTE DATA PARITY BITS FROM
4494 027556  013701  177750                   MOV     CMR,R1                  ;SAVE CMR DATA
4495 027562  000240                     25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
     027564  000240                             NOP                             ;FOR  LOOP ON ERROR
4496 027566  105037  177750                   CLRB    CMR                     ;DISABLE MAINT. MODE
4497 027572  012737  001015  177746           MOV     #OFF,CCR                ;DISABLE CACHE
4498 027600  032701  004000                   BIT     #HPB,R1                 ;CHECK  1 FOR UPPER BYTE PARITY STORE
4499 027604  001004                           BNE     8$                      ;PASS
4500 027606  104413                           ERROR                           ;ERROR
                                                                             ;-----
     027610  027606                           .WORD   .-2
4501                                                                         ;DATA PARITY GEN. & STORE TESTS
4502                                                                         ;READING CACHE MAINT. REGISTER
4503                                                                         ;BIT 11 FOR UPPER BYTE PARITY DATA DID
4504                                                                         ;NOT RESULT IN 1.
```

TEST # 154 - CHK THAT HI BYTE DATA PARITY GEN WRITES A 1

```
4505 027612  050516                        FLTPAT                  ;PRINT FLOATING 1 PATTERN USED FOR DATA PARITY
4506                                                                ;GENERATOR INPUTS: WRTD<15:0>
4507 027614  000000                        .WORD   0
4508 027616  032701  002000          8$:   BIT     #LPB,R1         ;CHECK 0 FOR LOWER BYTE PARITY DATA
4509 027622  001404                        BEQ     9$              ;PASS
4510 027624  104413                        ERROR                   ;ERROR
                                                                    ;-----
     027626  027624                        .WORD   .-2
4511                                                                ;DAT. PARITY GEN. $ STORE TESTS
4512                                                                ;READING CACHE MAINT. REGISTER
4513                                                                ;BIT 10 FOR LOWER BYTE PARITY DATA DID
4514                                                                ;NOT RESULT IN 0.
4515 027630  050516                        FLTPAT                  ;PRINT FLOATING 1 PATTERN USED FOR DATA PARITY
4516                                                                ;GEN. INPUTS: WRTD<15:0>
4517 027632  000000                        .WORD   0
4518 027634  006337  050516          9$:   ASL     FLTPAT          ;NEXT PATTERN
4519 027640  103327                        BCC     2$              ;CONTINUE IF PATTERN 100000 NOT DONE
4520 027642  000240                 10$:   NOP                     ;END OF TEST
     027644  005237  001472                INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
 4532                                   .SBTTL  TEST # 155 - VERIFY WRITE WRONG PARITY TO BYTES DATA PARITY
                                        ;;*****************************************************************
                                        ;*TEST 155      VERIFY WRITE WRONG PARITY TO BYTES DATA PARITY
                                        ;*      VERIFY  WRITE WRONG PARITY TO UPPER AND LOWER BYTE DATA PARITY
                                        ;*      STORE .
                                        ;*      CONDITIONS:
                                        ;*              INPUTS TO DATA PARITY GEN:
                                        ;*                  WRTD<15:0> ALL 0'S
                                        ;*                  WWPD(1)= 1
                                        ;*                 DATA PARITY STORE ADDRESS:
                                        ;*                  CA<12:1>=0000
                                        ;*      RESULT:     CMR<11:10> BOTH 1
                                        ;;*****************************************************************
      027650                            TST155:
      027650  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      027652  027662                            .WORD   40$             ;TEST START LOCATION
      027654  070004                            .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
      027656  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      027660  070040                            .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
      027662  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
      027670  004437  002452                    JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
      027674  030024                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

 4533 027676  005037  060000                    CLR     60000           ;0'S TO MAIN MEMORY LOCATION
 4534 027702  112737  000002  177750  1$:       MOVB    #HODO,CMR       ;ALLOWS UPPER AND LOWER BYTE DATA
 4535                                                                   ;PARITY STORE BITS TO BE WRITTEN TO
 4536                                                                   ;CMR<11:10> ONLY DURING THE  DESTINATION
 4537                                                                   ;ACCESS OF AN INSTRUCTION.
 4538 027710  012737  000115  177746            MOV     #15+WWPD,CCR    ;NO UCB SO AS TO WRITE ENABLE PARITY.
 4539                                                                   ;ENABLE WRITE WRONG PARITY DATA
 4540 027716  005737  040000                    TST     40000           ;
 4541 027722  005737  060000                    TST     60000           ;PLACE ALL 0'S ON WRTD<15:0> INPUTS
 4542                                                                   ;SINCE WWPD IS INVOKED A 1 WILL BE
 4543                                                                   ;WRITTEN INTO PARITY STORE LOCATION 0000.
 4544 027726  005737  060000                    TST     60000           ;WRITE UPPER AND LOWER DATA PARITY BITS FROM
 4545                                                                   ;LOCAT. 0000 INTO CMR<11:10> RESPECTIVELY.
 4546 027732  013701  177750                    MOV     CMR,R1          ;SAVE CMR DATA
 4547 027736  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      027740  000240                            NOP                     ;FOR  LOOP ON ERROR
 4548 027742  012737  001015  177746            MOV     #OFF,CCR        ;DISABLE CACHE
 4549 027750  105037  177750                    CLRB    CMR             ;DISABLE MAINT. MODE
 4550 027754  052737  000400  177746            BIS     #FC,CCR         ;BEFORE LEAVING TEST FLUSH CACHE TO
 4551                                                                   ;REMOVE ANY EFFECTS OF WWPD
 4552 027762  032737  010000  177746  200$:     BIT     #VCIP,CCR       ;WAIT TILL DONE
 4553 027770  001374                            BNE     200$
 4554 027772  032701  004000                    BIT     #HPB,R1         ;CHECK 1 FOR UPPER BYTE PARITY STORE.
 4555 027776  001003                            BNE     9$              ;PASS
 4556 030000  104413                            ERROR                   ;ERROR
                                                                        ;-----
      030002  030000                            .WORD   .-2
 4557                                                                   ;DATA PARITY GEN. & STORE TESTS
 4558                                                                   ;READING CACHE MAINT. REGISTER
 4559                                                                   ;BIT 11 FOR UPPER BYTE PARITY DATA DID
```

```
4560                                                            ;NOT RESULT IN 1.
4561 030004  000000                        .WORD   0
4562 030006  032701  002000          9$:    BIT     #LPB,R1      ;CHECK 1 FOR LOWER BYTE PARITY DATA
4563 030012  001003                        BNE     10$          ;PASS
4564 030014  104413                        ERROR                ;ERROR
                                                                ;-----
     030016  030014                        .WORD   .-2
4565                                                            ;DAT. PARITY GEN. $ STORE TESTS
4566                                                            ;READING CACHE MAINT. REGISTER
4567                                                            ;BIT 10 FOR LOWER BYTE PARITY DATA DID
4568                                                            ;NOT RESULT IN 1.
4569 030020  000000                        .WORD   0
4570 030022  000240                10$:    NOP                  ;END OF TEST
     030024  005237  001472                INC     $TESTN       ;INCREMENT TEST COUNTER
```

```
4586                                    .SBTTL  TEST # 156 - VERIFY THAT TAG  PARITY STORE CAN HOLD A 0
                                        ;;*****************************************************************
                                        ;*TEST 156      VERIFY THAT TAG  PARITY STORE CAN HOLD A 0
                                        ;*      VERIFY THAT TAG  PARITY STORE CAN HOLD A 0 AT TAG
                                        ;*      PARITY STORE LOCATION 0000.
                                        ;*      PROCEDURE: GENERATE 0 FROM TAG   PARITY
                                        ;*                  GENERATOR BY PLACING ALL 0'S ON INPUTS.
                                        ;*                  ZERO WILL BE WRITTEN  INTO TAG PARITY STORE
                                        ;*                 LOCATION 0000.READ TAG PARITY STORE BIT FROM
                                        ;*                 CMR<9>
                                        ;*      CONDITIONS:INPUTS TO TAG PARITY GEN:
                                        ;*                  TAG WRTD<21:13> ALL 0'S
                                        ;*                  WWPT(1)= 0
                                        ;*                 TAG PARITY STORE ADDRESS:
                                        ;*                  CA<12:1>=0000
                                        ;*      RESULT:     CMR<9>=  0
                                        ;;*****************************************************************
    030030                              TST156:
    030030  000004                              SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
    030032  030042                              .WORD   40$             ;TEST START LOCATION
    030034  070004                              .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
    030036  000000                              .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
    030040  070040                              .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
    030042  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
    030050  004437  002452                      JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
    030054  030152                              .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

4587 030056  005037  177752                    CLR     CHR             ;LOAD AMR<8:0> BY WRITING ALL 0'S TO CHR<8:0>
4588 030062  112737  000003  177750  1$:       MOVB    #HODO+TDAR,CMR  ; HODO ALLOWS TAG
4589                                                                    ;PARITY STORE BIT TO BE WRITTEN TO
4590                                                                    ;CMR<9> ONLY DURING THE  DESTINATION
4591                                                                    ;ACCESS OF AN INSTRUCTION.
4592                                                                    ;TDAR ALLOWS INPUTS TO TAG PARITY STORE
4593                                                                    ;GENERATOR TO BE LOADED FROM AMR<8:0>
4594 030070  012737  000015  177746              MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE PARITY
4595                                                                    ;STORE
4596 030076  005737  040000                    TST     40000           ;
4597 030102  005737  060000                    TST     60000           ;PLACE ALL 0'S ON TAG  WRTD<21:13> INPUTS
4598                                                                    ;THEREBY WRITING 0 INTO PARITY STORE LOCATION 0000.
4599 030106  005737  060000                    TST     60000           ;WRITE TAG PARITY BITS FROM LOCAT. 0000 INTO CMR<9>
4600 030112  013701  177750                    MOV     CMR,R1          ;SAVE CMR DATA
4601 030116  000240                  25$:      NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     030120  000240                            NOP                     ;FOR  LOOP ON ERROR
4602 030122  105037  177750                    CLRB    CMR             ;DISABLE MAINT. MODE
4603 030126  012737  001015  177746              MOV     #OFF,CCR        ;DISABLE CACHE
4604 030134  032701  001000                    BIT     #TPB,R1         ;CHECK FOR 0
4605 030140  001403                            BEQ     10$             ;PASS
4606 030142  104413                            ERROR                   ;ERROR
                                                                        ;-----
     030144  030142                            .WORD   .-2
4607                                                                    ;TAG PARITY GEN. & STORE TESTS
4608                                                                    ;READING CACHE MAINT. REGISTER
4609                                                                    ;BIT 9 FOR TAG PARITY DATA DID
```

TEST # 156 - VERIFY THAT TAG PARITY STORE CAN HOLD A 0

```
4610                                                        ;NOT RESULT IN 0.
4611 030146  000000                    .WORD   0
4612 030150  000240            10$:    NOP                  ;END OF TEST
     030152  005237  001472             INC     $TESTN       ;INCREMENT TEST COUNTER
```

```
4629                                    .SBTTL  TEST # 157 - VERIFY THAT TAG PARITY GENERATOR WILL WRITE A 1
                                        ;;*****************************************************************
                                        ;*TEST 157      VERIFY THAT TAG PARITY GENERATOR WILL WRITE A 1
                                        ;*      VERIFY THAT TAG PARITY GENERATOR WILL WRITE A 1 INTO TAG PARITY STORE
                                        ;*      ADDRESS 0000 FOR FLOATING 1 PATTERN ON TAG PARITY GENERATOR INPUTS
                                        ;*              PROCEDURE: GENERATE 1 FROM TAG   PARITY
                                        ;*                  GENERATOR BY PLACING FLOATING 1 PATTERN ON INPUTS
                                        ;*                 AND WRITING   1  INTO TAG PARITY STORE
                                        ;*                 LOCATION 0000.READ TAG PARITY STORE BIT FROM
                                        ;*                 CMR<9>
                                        ;*      CONDITIONS:
                                        ;*              INPUTS TO TAG PARITY GEN:
                                        ;*                  TAG WRTD<21:13> FLOATING 1 PATTERN
                                        ;*                  WWPD(1)= 0
                                        ;*                 TAG PARITY STORE ADDRESS:
                                        ;*                  CA<12:1>=0000
                                        ;*      RESULT:     CMR<9>=  1
                                        ;;*****************************************************************
     030156
     030156  000004                     TST157:
                                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     030160  030170                             .WORD   40$             ;TEST START LOCATION
     030162  070014                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     030164  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     030166  070050                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     030170  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     030176  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     030202  030326                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

4630 030204  012737  000001  050516             MOV     #1,FLTPAT       ;IST FLOATING PATTERN
4631 030212  013737  050516  177752  2$:        MOV     FLTPAT,CHR      ;LOAD AMR<8:0> BY WRITING FLOATING
4632                                            ;PATTERN TO CHR<8:0>.
4633 030220  112737  000003  177750  1$:        MOVB    #HODO+TDAR,CMR  ; HODO ALLOWS TAG
4634                                            ;PARITY STORE BIT TO BE WRITTEN TO
4635                                            ;CMR<9> ONLY DURING THE  DESTINATION
4636                                            ;ACCESS OF AN INSTRUCTION.
4637                                            ;TDAR ALLOWS INPUTS TO TAG PARITY STORE
4638                                            ;GENERATOR TO BE LOADED FROM AMR<8:0>
4639 030226  012737  000015  177746             MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE PARITY
4640                                            ;STORE
4641 030234  005737  040000                     TST     40000           ;
4642 030240  005737  060000                     TST     60000           ;PLACE FLOATING 1 PATTERN ON TAG  WRTD<21:13> INPUTS
4643                                            ;THEREBY WRITING 1 INTO PARITY STORE LOCATION 0000.
4644 030244  005737  060000                     TST     60000           ;WRITE TAG PARITY BIT FROM LOCAT. 0000 INTO CMR<9>
4645 030250  013701  177750                     MOV     CMR,R1          ;SAVE CMR DATA
4646 030254  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     030256  000240                             NOP                     ;FOR  LOOP ON ERROR
4647 030260  105037  177750                     CLRB    CMR             ;DISABLE MAINT. MODE
4648 030264  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
4649 030272  032701  001000                     BIT     #TPB,R1         ;CHECK FOR 1
4650 030276  001004                             BNE     9$              ;PASS
4651 030300  104413                             ERROR                   ;ERROR
                                                                        ;-----
     030302  030300                             .WORD   .-2
```

```
                                                                        ;TAG PARITY GEN. & STORE TESTS
                                                                        ;READING CACHE MAINT. REGISTER
                                                                        ;BIT 9 FOR TAG PARITY DATA DID
                                                                        ;NOT RESULT IN 1.
030304  050516                            FLTPAT                        ;PRINT FLOATING 1 PATTERN USED ON
                                                                        ;TAG PARITY GEN. INPUTS: TAG WRTD<21:13>
030306  000000                            .WORD   0
030310  006337  050516              9$:     ASL     FLTPAT              ;NEXT PATTERN
030314  032737  001000  050516            BIT     #1000,FLTPAT        ;HAS PATTERN 400 BEEN DONE
030322  001733                            BEQ     2$                  ;NO,CONTINUE
030324  000240                    10$:    NOP                         ;END OF TEST
030326  005237  001472                    INC     $TESTN              ;INCREMENT TEST COUNTER
```

```
4673                                    .SBTTL  TEST # 160 - VERIFY WRITE WRONG PARITY TO TAG PARITY STORE
                                        ;;*****************************************************************
                                        ;*TEST 160      VERIFY WRITE WRONG PARITY TO TAG PARITY STORE
                                        ;*      VERIFY WRITE WRONG PARITY TO TAG PARITY STOPE
                                        ;*      CONDITIONS:
                                        ;*              INPUTS TO TAG PARITY GEN:
                                        ;*                  TAG WRTD<21:13> ALL 0'S
                                        ;*                 WWPT(1)= 1
                                        ;*                TAG PARITY STORE ADDRESS:
                                        ;*                 CA<12:1>=0000
                                        ;*      RESULT:    CMR<9>=  1
                                        ;;*****************************************************************
     030332                             TST160:
     030332  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     030334  030344                             .WORD   40$             ;TEST START LOCATION
     030336  070004                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     030340  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     030342  070040                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     030344  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     030352  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     030356  030472                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

4674 030360  005037  177752                     CLR     CHR             ;LOAD AMR<8:0> WITH 0'S BY WRITING TO CHR<8:0>
4675 030364  112737  000003  177750  1$:        MOVB    #HODO+TDAR,CMR  ;HODO   ALLOWS TAG
4676                                                                    ;PARITY STORE BITS TO BE WRITTEN TO
4677                                                                    ;CMR<9> ONLY DURING THE  DESTINATION
4678                                                                    ;ACCESS OF AN INSTRUCTION.
4679                                                                    ;TDAR ALLOWS INPUTS TO TAG PARITY GEN.
4680                                                                    ;TO BE LOADED FROM AMR<8:0>
4681 030372  012737  002015  177746             MOV     #15+WWPT,CCR    ;NO UCB SO AS TO WRITE ENABLE PARITY.
4682                                                                    ;ENABLE WRITE WRONG PARITY TAG
4683 030400  005737  040000                     TST     40000           ;
4684 030404  005737  060000                     TST     60000           ;PLACE ALL 0'S ON TAG WRTD<20:13> INPUTS
4685                                                                    ;SINCE WWPT IS INVOKED A 1 WILL BE
4686                                                                    ;WRITTEN INTO PARITY STORE LOCATION 0000.
4687 030410  005737  060000                     TST     60000           ;WRITE TAG BIT FROM LOCAT. 0000 INTO CMR<9>
4688 030414  013701  177750                     MOV     CMR,R1          ;SAVE CMR DATA
4689 030420  000240                  25$:       NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     030422  000240                             NOP                     ;FOR  LOOP ON ERROR
4690 030424  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
4691 030432  105037  177750                     CLRB    CMR             ;DISABLE MAINT. MODE
4692 030436  052737  000400  177746             BIS     #FC,CCR         ;BEFORE LEAVING TEST FLUSH CACHE
4693                                                                    ;TO REMOVE ANY EFFECTS OF WWPT
4694 030444  032737  010000  177746  200$:      BIT     #VCIP,CCR       ;WAIT TILL DONE
4695 030452  001374                             BNE     200$
4696 030454  032701  001000                     BIT     #TPB,R1         ;CHECK 1 FOR TAG PARITY STORE.
4697 030460  001003                             BNE     10$             ;PASS
4698 030462  104413                             ERROR                   ;ERROR
                                                                        ;-----
     030464  030462                             .WORD   .-2

4699                                                                    ;TAG PARITY GEN. & STORE TESTS
4700                                                                    ;READING CACHE MAINT. REGISTER
4701                                                                    ;BIT 9 FOR TAG PARITY DATA DID
```

```
4702
4703 030466  000000                          .WORD   0                       ;NOT RESULT IN 1.
4704 030470  000240                  10$:    NOP                             ;END OF TEST
     030472  005237  001472                  INC     $TESTN                  ;INCREMENT TEST COUNTER
```

TEST # 161 - CLEAR ALL LOW CACHE DATA & TAG PARITY STORES

```
                                .SBTTL  TEST # 161 - CLEAR ALL LOW CACHE DATA & TAG PARITY STORES
                                ;;*****************************************************************
                                ;*TEST 161       CLEAR ALL LOW CACHE DATA & TAG PARITY STORES
                                ;*      WRITE AND READ 0'S TO ALL LOW CACHE DATA PARITY AND TAG PARITY STORES
                                ;*      CONDITIONS:
                                ;*              INPUTS TO DATA PARITY GEN:
                                ;*                  WRTD<15:0> ALL 0'S
                                ;*                  WWPD(1)= 0
                                ;*              INPUTS TO TAG PARITY GEN.:
                                ;*                  TAG WRTD<21:13> ALL 0'S
                                ;*                  WWPT(1)=0
                                ;*                DATA PARITY/TAG PARITY STORE ADDRESS:
                                ;*                  CA<12:1>=0000 TO 3777
                                ;*      RESULT:     CMR<11:9> ALL 0
                                ;;*****************************************************************
030476                          TST161:
030476  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
030500  030510                          .WORD   40$             ;TEST START LOCATION
030502  070030                          .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
030504  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
030506  070056                          .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
030510  012737  001015  177746  40$:    MOV     #OFF,CCR        ;DISABLE CACHE
030516  004437  002452                  JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
030522  030722                          .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE

4719 030524  005037  177752             CLR     CHR             ;LOAD AMR<8:0> WITH ALL 0'S
4720 030530  012705  060000             MOV     #60000,R5       ;ADDRESS 60000 TO R5
4721 030534  005025             2$:     CLR     (R5)+           ;CLEAR ALL LOW CACHE MAIN MEMORY
4722 030536  020527  070000             CMP     R5,#70000
4723 030542  001374                     BNE     2$
4724 030544  012705  060000             MOV     #60000,R5       ;1ST ADDRESS LOCATION IN R5
4725 030550  012703  040000             MOV     #40000,R3       ;ADDRESS 40000 IN R3
4726 030554  112737  000003  177750  1$:MOVB    #HODO+TDAR,CMR  ;HODO ALLOWS DATA PARITY/TAG PARITY
4727                                                            ; STORE BITS TO BE WRITTEN TO
4728                                                            ;CMR<11:9> ONLY DURING THE  DESTINATION
4729                                                            ;ACCESS OF AN INSTRUCTION.
4730                                                            ;TDAR ALLOWS TAG PARITY STORE GENERATOR
4731                                                            ;INPUTS TO BE LOADED FROM AMR<8:0>
4732 030562  012737  000015  177746         MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE PARITY STORE
4733 030570  005713                     TST     (R3)            ;
4734 030572  005715                     TST     (R5)            ;WRITE 0'S INTO DATA/TAG PARITY STORE
4735                                                            ;ADDRESS LOCATION SPECIFIED BY R5
4736 030574  005715                     TST     (R5)            ;WRITE DATA/TAG PARITY BITS INTO CMR<11:9>
4737 030576  013701  177750             MOV     CMR,R1          ;SAVE CMR DATA
4738 030602  000240             25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     030604  000240                     NOP                     ;FOR  LOOP ON ERROR
4739 030606  105037  177750             CLRB    CMR             ;DISABLE MAINT. MODE
4740 030612  012737  001015  177746         MOV     #OFF,CCR        ;DISABLE CACHE
4741 030620  010537  050506             MOV     R5,CA121        ;GET PARITY ADDRESS LOCATION USED
4742 030624  006237  050506             ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
4743 030630  032701  004000             BIT     #HPB,R1         ;CHECK  0 HI BYTE PARITY STORE
4744 030634  001404                     BEQ     7$              ;PASS
4745 030636  104413                     ERROR                   ;ERROR
```

```
                                                                ;-----
     030640  030636                        .WORD   .-2
4746                                                            ;DATA/TAG PARITY GEN. & STORE TESTS
4747                                                            ;READING CACHE MAINT. REGISTER
4748                                                            ;BIT 11 FOR UPPER BYTE PARITY DATA DID
4749                                                            ;NOT RESULT IN 0.
4750 030642  050506                        CA121                ;PRINT PARITY STORE ADDRESS LOCATION
4751                                                            ;USED: CA<12:1>
4752 030644  000000                        .WORD   0
4753 030646  032701  002000          7$:   BIT     #LPB,R1       ;CHECK 0 FOR LOWER BYTE PARITY DATA
4754 030652  001404                        BEQ     8$            ;PASS
4755 030654  104413                        ERROR                 ;ERROR
                                                                ;-----
     030656  030654                        .WORD   .-2
4756                                                            ;DATA/TAG PARITY GEN. $ STORE TESTS
4757                                                            ;READING CACHE MAINT. REGISTER
4758                                                            ;BIT 10 FOR LOWER BYTE PARITY DATA DID
4759                                                            ;NOT RESULT IN 0.
4760 030660  050506                        CA121                ;PRINT PARITY STORE ADDRESS USED:CA<12:1>
4761 030662  000000                        .WORD   0
4762 030664  032701  001000          8$:   BIT     #TPB,R1       ;CHECK 0 FOR TAG PARITY DATA
4763 030670  001404                        BEQ     9$            ;PASS
4764 030672  104413                        ERROR                 ;ERROR
                                                                ;-----
     030674  030672                        .WORD   .-2
4765                                                            ;DATA/TAG PARITY GEN. AND STORAGE TESTS
4766                                                            ;READING CACHE MAINT.REGISTER BIT 9 FOR
4767                                                            ;TAG PARITY DATA DID NOT RESULT IN 0.
4768 030676  050506                        CA121                ;PRINT PARITY STORE ADDRESS USED: CA<12:1>
4769 030700  000000                        .WORD   0
4770 030702  062705  000002          9$:   ADD     #2,R5         ;NEXT PARITY STORE ADDRESS LOCATION
4771 030706  062703  000002                ADD     #2,R3
4772 030712  022705  070000                CMP     #70000,R5     ;HAVE ALL LOW CACHE PARITY STORE ADDRESS
4773                                                            ;LOCATIONS BEEN DONE
4774 030716  001316                        BNE     1$            ;NO,CONTINUE
4775 030720  000240                10$:   NOP                   ;END OF TEST
     030722  005237  001472                INC     $TESTN        ;INCREMENT TEST COUNTER
```

```
4789                                    .SBTTL  TEST # 162 - CLEAR ALL CACHE DATA & TAG PARITY STORES
                                        ;;*****************************************************************
                                        ;*TEST 162      CLEAR ALL CACHE DATA & TAG PARITY STORES
                                        ;*      WRITE AND READ 0'S TO ALL HI CACHE DATA PARITY AND TAG PARITY STORES
                                        ;*      CONDITIONS:
                                        ;*              INPUTS TO DATA PARITY GEN:
                                        ;*                  WRTD<15:0> ALL 0'S
                                        ;*                  WWPD(1)= 0
                                        ;*              INPUTS TO TAG PARITY GEN.:
                                        ;*                  TAG WRTD<21:13> ALL 0'S
                                        ;*                  WWPT(1)=0
                                        ;*                DATA PARITY/TAG PARITY STORE ADDRESS:
                                        ;*                  CA<12:1>=4000 TO 7777
                                        ;*      RESULT:     CMR<11:9> ALL 0
                                        ;;*****************************************************************
030726                                  TST162:
030726  000004                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
030730  030740                                .WORD   40$             ;TEST START LOCATION
030732  060030                                .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
030734  000000                                .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
030736  060056                                .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
030740  012737  001015  177746  40$:    MOV     #OFF,CCR                ;DISABLE CACHE
030746  004437  002424                        JSR     R4,RELCTL               ;LOCATE TEST CODE TO LOW CACHE SPACE
030752  031152                                .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

4790 030754  005037  177752                    CLR     CHR                     ;LOAD AMR<8:0> WITH ALL 0'S
4791 030760  012705  070000                    MOV     #70000,R5               ;ADDRESS 70000 TO R5
4792 030764  005025                    2$:     CLR     (R5)+                   ;CLEAR ALL HI CACHE MAIN MEMORY
4793 030766  020527  100000                    CMP     R5,#100000
4794 030772  001374                            BNE     2$
4795 030774  012705  070000                    MOV     #70000,R5               ;1ST ADDRESS LOCATION IN R5
4796 031000  012703  050000                    MOV     #50000,R3               ;ADDRESS 50000 IN R3
4797 031004  112737  000003  177750    1$:     MOVB    #HODO+TDAR,CMR          ;HODO ALLOWS DATA PARITY/TAG PARITY
4798                                                                            ; STORE BITS TO BE WRITTEN TO
4799                                                                            ;CMR<11:9> ONLY DURING THE  DESTINATION
4800                                                                            ;ACCESS OF AN INSTRUCTION.
4801                                                                            ;TDAR ALLOWS TAG PARITY STORE GENERATOR
4802                                                                            ;INPUTS TO BE LOADED FROM AMR<8:0>
4803 031012  012737  000015  177746            MOV     #15,CCR                 ;NO UCB SO AS TO WRITE ENABLE PARITY
4804                                                                            ;STORE
4805 031020  005713                            TST     (R3)                    ;
4806 031022  005715                            TST     (R5)                    ;WRITE 0'S INTO DATA/TAG PARITY STORE
4807                                                                            ;ADDRESS LOCATION SPECIFIED BY R5
4808 031024  005715                            TST     (R5)                    ;WRITE DATA/TAG PARITY BITS INTO CMR<11:9>
4809 031026  013701  177750                    MOV     CMR,R1                  ;SAVE CMR DATA
4810 031032  000240                    25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
     031034  000240                            NOP                             ;FOR  LOOP ON ERROR
4811 031036  105037  177750                    CLRB    CMR                     ;DISABLE MAINT. MODE
4812 031042  012737  001015  177746            MOV     #OFF,CCR                ;DISABLE CACHE
4813 031050  010537  050506                    MOV     R5,CA121                ;GET PARITY ADDRESS LOCATION USED
4814 031054  006237  050506                    ASR     CA121                   ;PREPARE CA121 FOR TYPEOUT
4815 031060  032701  004000                    BIT     #HPB,R1                 ;CHECK  0 HI BYTE PARITY STORE
4816 031064  001404                            BEQ     7$                      ;PASS
```

TEST # 162 - CLEAR ALL CACHE DATA & TAG PARITY STORES

```
 4817 031066  104413                        ERROR                   ;ERROR
                                                                      ;-----
      031070  031066                        .WORD   .-2
 4818                                                                 ;DATA/TAG PARITY GEN. & STORE TESTS
 4819                                                                 ;READING CACHE MAINT. REGISTER
 4820                                                                 ;BIT 11 FOR UPPER BYTE PARITY DATA DID
 4821                                                                 ;NOT RESULT IN 0.
 4822 031072  050506                        CA121                   ;PRINT PARITY STORE ADDRESS LOCATION
 4823                                                                 ;USED: CA<12:1>
 4824 031074  000000                        .WORD   0
 4825 031076  032701  002000          7$:    BIT     #LPB,R1         ;CHECK 0 FOR LOWER BYTE PARITY DATA
 4826 031102  001404                        BEQ     8$              ;PASS
 4827 031104  104413                        ERROR                   ;ERROR
                                                                      ;-----
      031106  031104                        .WORD   .-2
 4828                                                                 ;DATA/TAG PARITY GEN. $ STORE TESTS
 4829                                                                 ;READING CACHE MAINT. REGISTER
 4830                                                                 ;BIT 10 FOR LOWER BYTE PARITY DATA DID
 4831                                                                 ;NOT RESULT IN 0.
 4832 031110  050506                        CA121                   ;PRINT PARITY STORE ADDRESS USED:CA<12:1>
 4833 031112  000000                        .WORD   0
 4834 031114  032701  001000          8$:    BIT     #TPB,R1         ;CHECK 0 FOR TAG PARITY DATA
 4835 031120  001404                        BEQ     9$              ;PASS
 4836 031122  104413                        ERROR                   ;ERROR
                                                                      ;-----
      031124  031122                        .WORD   .-2
 4837                                                                 ;DATA/TAG PARITY GEN. AND STORAGE TESTS
 4838                                                                 ;READING CACHE MAINT.REGISTER BIT 9 FOR
 4839                                                                 ;TAG PARITY DATA DID NOT RESULT IN 0.
 4840 031126  050506                        CA121                   ;PRINT PARITY STORE ADDRESS USED: CA<12:1>
 4841 031130  000000                        .WORD   0
 4842 031132  062705  000002          9$:    ADD     #2,R5           ;NEXT PARITY STORE ADDRESS LOCATION
 4843 031136  062703  000002                ADD     #2,R3
 4844 031142  022705  100000                CMP     #100000,R5      ;HAVE ALL HI CACHE PARITY STORE ADDRESS
 4845                                                                 ;LOCATIONS BEEN DONE
 4846 031146  001316                        BNE     1$              ;NO,CONTINUE
 4847 031150  000240                10$:    NOP                     ;END OF TEST
      031152  005237  001472                INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
4861                                    .SBTTL  TEST # 163 - CHK SETTING HI CACHE DATA & TAG PARITY STORES
                                        ;;*****************************************************************
                                        ;*TEST 163       CHK SETTING HI CACHE DATA & TAG PARITY STORES
                                        ;*      WRITE AND READ 1'S TO ALL LOW CACHE DATA PARITY AND TAG PARITY STORES
                                        ;*      CONDITIONS:
                                        ;*              INPUTS TO DATA PARITY GEN:
                                        ;*                  WRTD<15:0>= 000401
                                        ;*                  WWPD(1)= 0
                                        ;*              INPUTS TO TAG PARITY GEN.:
                                        ;*                  TAG WRTD<21:13> BIT PATTERN 000000001
                                        ;*                  WWPT(1)=0
                                        ;*                 DATA PARITY/TAG PARITY STORE ADDRESS:
                                        ;*                  CA<12:1>=0000 TO 3777
                                        ;*      RESULT:     CMR<11:9> ALL 1'S
                                        ;*****************************************************************
      031156                            TST163:
      031156  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      031160  031170                            .WORD   40$             ;TEST START LOCATION
      031162  070034                            .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
      031164  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      031166  070062                            .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
      031170  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
      031176  004437  002452                    JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
      031202  031406                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

4862  031204  012737  000001  177752            MOV     #1,CHR          ;LOAD AMR<8:0> WITH BIT PATTERN 000000001
4863  031212  012705  060000                    MOV     #60000,R5       ;ADDRESS 60000 TO R5
4864  031216  012725  000401            2$:     MOV     #401,(R5)+      ;WRITE A 401 IN ALL LOW CACHE MAIN MEMORY
4865  031222  020527  070000                    CMP     R5,#70000
4866  031226  001373                            BNE     2$
4867  031230  012705  060000                    MOV     #60000,R5       ;1ST ADDRESS LOCATION IN R5
4868  031234  012703  040000                    MOV     #40000,R3       ;ADDRESS 40000 IN R3
4869  031240  112737  000003  177750    1$:     MOVB    #HODO+TDAR,CMR  ;HODO ALLOWS DATA PARITY/TAG PARITY
4870                                                                    ; STORE BITS TO BE WRITTEN TO
4871                                                                    ;CMR<11:9> ONLY DURING THE  DESTINATION
4872                                                                    ;ACCESS OF AN INSTRUCTION.
4873                                                                    ;TDAR ALLOWS TAG PARITY STORE GENERATOR
4874                                                                    ;INPUTS TO BE LOADED FROM AMR<8:0>
4875  031246  012737  000015  177746              MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE PARITY STORE
4876  031254  005713                            TST     (R3)            ;
4877  031256  005715                            TST     (R5)            ;WRITE 1'S INTO DATA/TAG PARITY STORE
4878                                                                    ;ADDRESS LOCATION SPECIFIED BY R5
4879  031260  005715                            TST     (R5)            ;WRITE DATA/TAG PARITY BITS INTO CMR<11:9>
4880  031262  013701  177750                    MOV     CMR,R1          ;SAVE CMR DATA
4881  031266  000240            25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
      031270  000240                    NOP                             ;FOR  LOOP ON ERROR
4882  031272  105037  177750                    CLRB    CMR             ;DISABLE MAINT. MODE
4883  031276  012737  001015  177746              MOV     #OFF,CCR        ;DISABLE CACHE
4884  031304  010537  050506                    MOV     R5,CA121        ;GET PARITY ADDRESS LOCATION USED
4885  031310  006237  050506                    ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
4886  031314  032701  004000                    BIT     #HPB,R1         ;CHECK  1 HI BYTE PARITY STORE
4887  031320  001004                            BNE     7$              ;PASS
4888  031322  104413                            ERROR                   ;ERROR
```

```
                                                                ;-----
     031324  031322                          .WORD   .-2
4889                                                            ;DATA/TAG PARITY GEN. & STORE TESTS
4890                                                            ;READING CACHE MAINT. REGISTER
4891                                                            ;BIT 11 FOR UPPER BYTE PARITY DATA DID
4892                                                            ;NOT RESULT IN 1.
4893 031326  050506                          CA121                     ;PRINT PARITY STORE ADDRESS LOCATION
4894                                                            ;USED: CA<12:1>
4895 031330  000000                          .WORD   0
4896 031332  032701  002000          7$:     BIT     #LPB,R1           ;CHECK 1 FOR LOWER BYTE PARITY DATA
4897 031336  001004                          BNE     8$                ;PASS
4898 031340  104413                          ERROR                     ;ERROR
                                                                ;-----
     031342  031340                          .WORD   .-2
4899                                                            ;DATA/TAG PARITY GEN. & STORE TESTS
4900                                                            ;READING CACHE MAINT. REGISTER
4901                                                            ;BIT 10 FOR LOWER BYTE PARITY DATA DID
4902                                                            ;NOT RESULT IN 1.
4903 031344  050506                          CA121                     ;PRINT PARITY STORE ADDRESS USED:CA<12:1>
4904 031346  000000                          .WORD   0
4905 031350  032701  001000          8$:     BIT     #TPB,R1           ;CHECK 1 FOR TAG PARITY DATA
4906 031354  001004                          BNE     9$                ;PASS
4907 031356  104413                          ERROR                     ;ERROR
                                                                ;-----
     031360  031356                          .WORD   .-2
4908                                                            ;DATA/TAG PARITY GEN. AND STORAGE TESTS
4909                                                            ;READING CACHE MAINT.REGISTER BIT 9 FOR
4910                                                            ;TAG PARITY DATA DID NOT RESULT IN 1.
4911 031362  050506                          CA121                     ;PRINT PARITY STORE ADDRESS USED: CA<12:1>
4912 031364  000000                          .WORD   0
4913 031366  062705  000002          9$:     ADD     #2,R5             ;NEXT PARITY STORE ADDRESS LOCATION
4914 031372  062703  000002                  ADD     #2,R3
4915 031376  022705  070000                  CMP     #70000,R5         ;HAVE ALL LOW CACHE PARITY STORE ADDRESS
4916                                                            ;LOCATIONS BEEN DONE
4917 031402  001316                          BNE     1$                ;NO,CONTINUE
4918 031404  000240                  10$:    NOP                       ;END OF TEST
     031406  005237  001472                  INC     $TESTN            ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 164 - CHK SETTING HI CACHE DATA & TAG PARITY STORES
                                ;;*****************************************************************
                                ;*TEST 164      CHK SETTING HI CACHE DATA & TAG PARITY STORES
                                ;*      WRITE AND READ 1'S TO ALL HI CACHE DATA PARITY AND TAG PARITY STORES
                                ;*      CONDITIONS:
                                ;*              INPUTS TO DATA PARITY GEN:
                                ;*                  WRTD<15:0>= 000401
                                ;*                  WWPD(1)= 0
                                ;*              INPUTS TO TAG PARITY GEN.:
                                ;*                  TAG WRTD<21:13> =BIT PATTERN 000000001
                                ;*                  WWPT(1)=0
                                ;*                 DATA PARITY/TAG PARITY STORE ADDRESS:
                                ;*                  CA<12:1>=4000 TO 7777
                                ;*      RESULT:     CMR<11:9> ALL 1'S
                                ;;*****************************************************************
 031412                         TST164:
 031412  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
 031414  031424                        .WORD   40$             ;TEST START LOCATION
 031416  060034                        .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
 031420  000000                        .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
 031422  060062                        .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
 031424  012737  001015  177746  40$:  MOV     #OFF,CCR        ;DISABLE CACHE
 031432  004437  002424                JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
 031436  031642                        .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO LOW CACHE SPACE

4933 031440  012737  000001  177752        MOV     #1,CHR          ;LOAD AMR<8:0> WITH BIT PATTERN 000000001
4934 031446  012705  070000                MOV     #70000,R5       ;ADDRESS 70000 TO R5
4935 031452  012725  000401          2$:   MOV     #401,(R5)+      ;WRITE A 401 TO ALL HI CACHE
4936 031456  020527  100000                CMP     R5,#100000
4937 031462  001373                        BNE     2$
4938 031464  012705  070000                MOV     #70000,R5       ;1ST ADDRESS LOCATION IN R5
4939 031470  012703  050000                MOV     #50000,R3       ;ADDRESS 50000 IN R3
4940 031474  112737  000003  177750  1$:   MOVB    #HODO+TDAR,CMR  ;HODO ALLOWS DATA PARITY/TAG PARITY
4941                                                                ; STORE BITS TO BE WRITTEN TO
4942                                                                ;CMR<11:9> ONLY DURING THE  DESTINATION
4943                                                                ;ACCESS OF AN INSTRUCTION.
4944                                                                ;TDAR ALLOWS TAG PARITY STORE GENERATOR
4945                                                                ;INPUTS TO BE LOADED FROM AMR<8:0>
4946 031502  012737  000015  177746        MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE PARITY STORE
4947 031510  005713                        TST     (R3)            ;
4948 031512  005715                        TST     (R5)            ;WRITE 1'S INTO DATA/TAG PARITY STORE
4949                                                                ;ADDRESS LOCATION SPECIFIED BY R5
4950 031514  005715                        TST     (R5)            ;WRITE DATA/TAG PARITY BITS INTO CMR<11:9>
4951 031516  013701  177750                MOV     CMR,R1          ;SAVE CMR DATA
4952 031522  000240          25$:  NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
     031524  000240                NOP                             ;FOR  LOOP ON ERROR
4953 031526  105037  177750                CLRB    CMR             ;DISABLE MAINT. MODE
4954 031532  012737  001015  177746        MOV     #OFF,CCR        ;DISABLE CACHE
4955 031540  010537  050506                MOV     R5,CA121        ;GET PARITY ADDRESS LOCATION USED
4956 031544  006237  050506                ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
4957 031550  032701  004000                BIT     #HPB,R1         ;CHECK  1 HI BYTE PARITY STORE
4958 031554  001004                        BNE     7$              ;PASS
4959 031556  104413                        ERROR                   ;ERROR
```

```
                                                                ;-----
     031560  031556                        .WORD   .-2
4960
4961                                                            ;DATA/TAG PARITY GEN. & STORE TESTS
4962                                                            ;READING CACHE MAINT. REGISTER
4963                                                            ;BIT 11 FOR UPPER BYTE PARITY DATA DID
4964 031562  050506                        CA121               ;NOT RESULT IN 1.
4965                                                            ;PRINT PARITY STORE ADDRESS LOCATION
4966 031564  000000                        .WORD   0           ;USED: CA<12:1>
4967 031566  032701  002000          7$:   BIT     #LPB,R1     ;CHECK 1 FOR LOWER BYTE PARITY DATA
4968 031572  001004                        BNE     8$          ;PASS
4969 031574  104413                        ERROR               ;ERROR
                                                                ;-----
     031576  031574                        .WORD   .-2
4970
4971                                                            ;DATA/TAG PARITY GEN. $ STORE TESTS
4972                                                            ;READING CACHE MAINT. REGISTER
4973                                                            ;BIT 10 FOR LOWER BYTE PARITY DATA DID
4974 031600  050506                        CA121               ;NOT RESULT IN 1.
4975 031602  000000                        .WORD   0           ;PRINT PARITY STORE ADDRESS USED:CA<12:1>
4976 031604  032701  001000          8$:   BIT     #TPB,R1     ;CHECK 1 FOR TAG PARITY DATA
4977 031610  001004                        BNE     9$          ;PASS
4978 031612  104413                        ERROR               ;ERROR
                                                                ;-----
     031614  031612                        .WORD   .-2
4979
4980                                                            ;DATA/TAG PARITY GEN. AND STORAGE TESTS
4981                                                            ;READING CACHE MAINT.REGISTER BIT 9 FOR
4982 031616  050506                        CA121               ;TAG PARITY DATA DID NOT RESULT IN 0.
4983 031620  000000                        .WORD   0           ;PRINT PARITY STORE ADDRESS USED: CA<12:1>
4984 031622  062705  000002          9$:   ADD     #2,R5       ;NEXT PARITY STORE ADDRESS LOCATION
4985 031626  062703  000002                ADD     #2,R3
4986 031632  022705  100000                CMP     #100000,R5  ;HAVE ALL HI CACHE PARITY STORE ADDRESS
4987                                                            ;LOCATIONS BEEN DONE
4988 031636  001716                        BEQ     1$          ;NO,CONTINUE
4989 031640  000240                10$:   NOP                 ;END OF TEST
     031642  005237  001472                INC     $TESTN      ;INCREMENT TEST COUNTER
```

TEST # 165 - VERIFY BYTE DATA PARITY STORE ADDRESS LINES

```
5002                                    .SBTTL  TEST # 165 - VERIFY BYTE DATA PARITY STORE ADDRESS LINES
                                        ;;*****************************************************************
                                        ;*TEST 165      VERIFY BYTE DATA PARITY STORE ADDRESS LINES
                                        ;*      VERIFY HI & LO BYTE DATA PARITY STORE ADDRESS LINES
                                        ;*      PROCEDURE:      WRITE 0 INTO HI & LO BYTE DATA PARITY STORE
                                        ;*                      ADDRESS LOCATION 0000.
                                        ;*                      WRITE A 1 INTO HI & LO BYTE DATA PARIT    ORE
                                        ;*                      ADDRESS LOCAT. 0001.
                                        ;*                      READ HI & LO BYTE DATA PARITY ADDRESS LOC.
                                        ;*                      0000 FOR 0'S.
                                        ;*                      REPEAT THE ABOVE SEQUENCE ,EACH TIME CHANGING THE
                                        ;*                      ADDRESS LOCATION THE 1 IS WRITTEN INTO BY
                                        ;*                      SHIFTING THE 1 ONE PLACE TO THE LEFT.
                                        ;;*****************************************************************
      031646                            TST165:
      031646  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      031650  031660                            .WORD   40$             ;TEST START LOCATION
      031652  070040                            .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
      031654  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      031656  070100                            .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
      031660  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
      031666  004437  002452                    JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
      031672  032116                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

5003  031674  000240                            NOP                     ;THIS 'NOP' WILL BE AT LOCATION 70000
5004                                                                    ;WHEN THE TEST IS RELOCATED TO Hi
5005                                                                    ;CACHE. IT WILL BE OVERWRITTEN WITH
5006                                                                    ;'401' WHEN THE TEST IS EXECUTED.
5007  031676  005037  060000                    CLR     60000           ;CLEAR LOCATION 60000 IN MAIN MEMORY
5008  031702  012737  000002  050516            MOV     #2,FLTPAT       ;1ST FLOATING CACHE DATA STORE ADDRESS PATTERN
5009  031710  012702  040000          2$:       MOV     #40000,R2       ;ADDRESS 40000 INTO R2
5010  031714  012703  060000                    MOV     #60000,R3       ;ADRESS 60000 INTO R3
5011  031720  063702  050516                    ADD     FLTPAT,R2       ;R2 CONTAINS 40000+FLTPAT
5012  031724  063703  050516                    ADD     FLTPAT,R3       ;R3 CONTAINS 60000+FLTPAT
5013  031730  012713  000401                    MOV     #401,(R3)       ;ODD DATA IN HI & LO BYTE AREAS OF
5014                                                                    ;LOCATION SPECIFIED BY R3
5015  031734  112737  000002  177750  1$:       MOVB    #HODO,CMR       ;HODO ALLOWS HI & LO BYTE DATA PARITY
5016                                                                    ;STORE BITS TO BE WRITTEN TO CMR<11:10>
5017                                                                    ; ONLY DURING THE
5018                                                                    ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
5019  031742  012737  000015  177746            MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE DATA PARITY STORE
5020  031750  005737  040000                    TST     40000
5021  031754  005737  060000                    TST     60000           ;READ UPDATE: WRITE 0'S INTO HI AND LO
5022                                                                    ;BYTE DATA PARITY STORES
5023  031760  005712                            TST     (R2)
5024  031762  005713                            TST     (R3)            ;WRITE 1 INTO HI & LO BYTE DATA
5025                                                                    ;PARITY STORE LOCATION
5026                                                                    ;SPECIFIED BY R3'S BITS 1 THRU 12:CA<12:1>.
5027  031764  005737  060000                    TST     60000           ;LOAD DATA FROM HI & LO BYTE PARITY
5028                                                                    ;DATA PARITY STORE LOCATION
5029                                                                    ;0000 INTO CMR<11:10>.
5030  031770  013701  177750                    MOV     CMR,R1          ;SAVE CMR DATA
5031  031774  000240                  25$:      NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
```

```
        031776  000240                          NOP                     ;FOR  LOOP ON ERROR
 5032   032000  105037  177750                  CLRB    CMR             ;DISABLE MAINT. MODE
 5033   032004  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
 5034   032012  032701  004000                  BIT     #HPB,R1         ;READING CMR<11> FOR HI BYTE
 5035                                                                   ;DATA PARITY STORE DATA SHOULD RESULT
 5036                                                                   ;IN 0.
 5037   032016  001411                          BEQ     8$              ;PASS
 5038   032020  013737  050516  050506          MOV     FLTPAT,CA121    ;SAVE CA<12:1> USED
 5039   032026  006237  050506                  ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
 5040   032032  104413                          ERROR                   ;ERROR
                                                                        ;-----
        032034  032032                          .WORD   .-2
 5041                                                                   ;HI & LO BYTE DATA PARITY STORE ADDRESS TEST
 5042                                                                   ;HI BYTE DATA PARITY STORE LOC. 0000
 5043                                                                   ;DID NOT READ AS A 0 INDICATING THAT
 5044                                                                   ;IT WAS OVERWRITTEN WITH A 1. THIS
 5045                                                                   ;SUGGESTS HI BYTE DATA PARITY STORE
 5046                                                                   ;ADDRESS LINE IS BAD.
 5047   032036  050506                          CA121                   ;PRINT PARITY DTORE ADDRESS FAILURE
 5048                                                                   ;CA<12:1>.
 5049                                                                   ;NOTE THAT THE 1 IN THIS PATTERN
 5050                                                                   ;WILL POINT TO THE ADDRESS LINE OF
 5051                                                                   ;THAT BROUGHT OUT ERROR.
 5052   032040  000000                          .WORD   0
 5053   032042  032701  004000          8$:     BIT     #HPB,R1         ;READING CMR<10> FOR LO BYTE
 5054                                                                   ;DATA PARITY STORE DATA SHOULD RESULT
 5055                                                                   ;IN 0.
 5056   032046  001411                          BEQ     9$              ;PASS
 5057   032050  013737  050516  050506          MOV     FLTPAT,CA121    ;SAVE CA<12:1> USED
 5058   032056  006237  050506                  ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
 5059   032062  104413                          ERROR                   ;ERROR
                                                                        ;-----
        032064  032062                          .WORD   .-2
 5060                                                                   ;Hi & LO BYTE DATA PARITY STORE ADDRESS TEST
 5061                                                                   ;LO BYTE DATA PARITY STORE LOC. 0000
 5062                                                                   ;DID NOT READ AS A 0 INDICATING THAT
 5063                                                                   ;IT WAS OVERWRITTEN WITH A 1. THIS
 5064                                                                   ;SUGGESTS HI BYTE DATA PARITY STORE
 5065                                                                   ;ADDRESS LINE IS BAD.
 5066   032066  050506                          CA121                   ;PRINT PARITY STORE ADDRESS FAILURE
 5067                                                                   ;CA<12:1>.
 5068                                                                   ;NOTE THAT THE 1 IN THIS PATTERN
 5069                                                                   ;WILL POINT TO THE ADDRESS LINE OF
 5070                                                                   ;THAT BROUGHT OUT ERROR.
 5071   032070  000000                          .WORD   0
 5072   032072  006337  050516          9$:     ASL     FLTPAT          ;NEXT PATTERN
 5073   032076  022737  020000  050516          CMP     #20000,FLTPAT   ;HAS DATA PARITY  STORE  ADDRESS 4000 BEEN DONE?
 5074   032104  001301                          BNE     2$              ;NO
 5075   032106  012737  000240  070000          MOV     #240,70000      ;RESTORE OVERWRITTEN LOCATION 70000 WITH NOP.
 5076   032114  000240                  10$:    NOP                     ;END OF TEST
        032116  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 166 - VERIFY TAG PARITY STORE ADDRESS LINES

```
5089                                    .SBTTL  TEST # 166 - VERIFY TAG PARITY STORE ADDRESS LINES
                                        ;;*****************************************************************
                                        ;*TEST 166      VERIFY TAG PARITY STORE ADDRESS LINES
                                        ;*      VERIFY TAG PARITY STORE ADDRESS LINES
                                        ;*      PROCEDURE:      WRITE 0 INTO TAG PARITY STORE
                                        ;*                      ADDRESS LOCATION 0000.
                                        ;*                      WRITE A 1 INTO TAG PARITY STORE
                                        ;*                      ADDRESS LOCAT. 0001.
                                        ;*                      READ TAG PARITY ADDRESS LOC.
                                        ;*                      0000 FOR 0'S.
                                        ;*                      REPEAT THE ABOVE SEQUENCE ,EACH TIME CHANGING THE
                                        ;*                      ADDRESS LOCATION THE 1 IS WRITTEN INTO BY
                                        ;*                      SHIFTING THE 1 ONE PLACE TO THE LEFT.
                                        ;;*****************************************************************
    032122                              TST166:
    032122  000004                              SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
    032124  032134                              .WORD   40$             ;TEST START LOCATION
    032126  070026                              .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
    032130  000000                              .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
    032132  070066                              .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
    032134  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
    032142  004437  002452                      JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
    032146  032322                              .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

5090 032150  012737  000002  050516          MOV     #2,FLTPAT       ;1ST FLOATING CACHE DATA STORE ADDRESS PATTERN
5091 032156  012702  040000          2$:     MOV     #40000,R2       ;ADDRESS 40000 INTO R2
5092 032162  012703  060000                  MOV     #60000,R3       ;ADRESS 60000 INTO R3
5093 032166  063702  050516                  ADD     FLTPAT,R2       ;R2 CONTAINS 40000+FLTPAT
5094 032172  063703  050516                  ADD     FLTPAT,R3       ;R3 CONTAINS 60000+FLTPAT
5095 032176  112737  000002  177750  1$:     MOVB    #HODO,CMR       ;HODO ALLOWS TAG PARITY
5096                                                                  ;STORE BITS TO BE WRITTEN TO CMR<9>
5097                                                                  ; ONLY DURING THE
5098                                                                  ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
5099 032204  012737  000015  177746          MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE DATA PARITY STORE
5100 032212  005737  040000                  TST     40000
5101 032216  005737  060000                  TST     60000           ;READ UPDATE: WRITE 0 INTO TAG
5102                                                                  ; PARITY STORE
5103 032222  005713                          TST     (R3)
5104 032224  005712                          TST     (R2)            ;WRITE 1 INTO TAG
5105                                                                  ;PARITY STORE LOCATION
5106                                                                  ;SPECIFIED BY R2'S BITS 1 THRU 12:CA<12:1>.
5107 032226  005737  060000                  TST     60000           ;LOAD DATA FROM
5108                                                                  ;TAG PARITY STORE LOCATION
5109                                                                  ;0000 INTO CMR<9>.
5110 032232  013701  177750                  MOV     CMR,R1          ;SAVE CMR DATA
5111 032236  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     032240  000240                          NOP                     ;FOR  LOOP ON ERROR
5112 032242  105037  177750                  CLRB    CMR             ;DISABLE MAINT. MODE
5113 032246  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
5114 032254  032701  001000                  BIT     #TPB,R1         ;READING CMR<9> FOR TAG PARITY STORE
5115                                                                  ;DATA SHOULD RESULT IN 0
5116 032260  001411                          BEQ     9$              ;PASS
5117 032262  013737  050516  050506          MOV     FLTPAT,CA121    ;SAVE CA<12:1> USED
```

TEST # 166 - VERIFY TAG PARITY STORE ADDRESS LINES

```
5118 032270  006237  050506                ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
5119 032274  104413                       ERROR                   ;ERROR
                                                                   ;-----
     032276  032274                       .WORD   .-2
5120                                                               ;TAG PARITY STORE ADDRESS TEST
5121                                                               ;TAG PARITY STORE LOC. 0000
5122                                                               ;DID NOT READ AS A 0 INDICATING THAT
5123                                                               ;IT WAS OVERWRITTEN WITH A 1. THIS
5124                                                               ;SUGGESTS TAG PARITY STORE
5125                                                               ;ADDRESS LINE IS BAD.
5126 032300  050506                       CA121                   ;PRINT PARITY STORE ADDRESS FAILURE
5127                                                               ;CA<12:1>.
5128                                                               ;NOTE THAT THE 1 IN THIS PATTERN
5129                                                               ;WILL POINT TO THE ADDRESS LINE OF
5130                                                               ;THAT BROUGHT OUT ERROR.
5131 032302  000000                       .WORD   0
5132 032304  006337  050516          9$:  ASL     FLTPAT          ;NEXT PATTERN
5133 032310  022737  020000  050516       CMP     #20000,FLTPAT   ;HAS TAG PARITY  STORE  ADDRESS 4000 BEEN DONE?
5134 032316  001317                       BNE     2$              ;NO
5135 032320  000240                 10$:  NOP                     ;END OF TEST
     032322  005237  001472                INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 167 - PARITY ERROR BITS IN CME=0 AFTER WRITE TO CME

```
5140                                    .SBTTL  TEST # 167 - PARITY ERROR BITS IN CME=0 AFTER WRITE TO CME
                                        ;;*****************************************************************
                                        ;*TEST 167      PARITY ERROR BITS IN CME=0 AFTER WRITE TO CME
                                        ;*      VERIFY THAT ALL PARITY ERROR BITS IN CACHE MEMORY ERROR REGISTER
                                        ;*      WILL READ 0 FOLLOWING A WRITE TO CME.
                                        ;;*****************************************************************
                                        TST167:
     032326
     032326  000004                               SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                          ;ERROR/LOOP ON TEST
     032330  032340                               .WORD   40$             ;TEST START LOCATION
     032332  070000                               .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     032334  000000                               .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     032336  070016                               .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     032340  012737  001015  177746  40$:    MOV     #OFF,CCR        ;DISABLE CACHE
     032346  004437  002452                  JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     032352  032424                           .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

5141 032354  112737  000002  177750  1$:     MOVB    #HODO,CMR       ;HODO WILL ALLOW CLOCKING OF PARITY INFO.
5142                                                                  ;TO CME ONLY DURING THE DESTINATION ACCESS OF AN
5143                                                                  ;INSTRUCTION. THE EFFECT
5144                                                                  ;IS THAT NO CLOCKING WILL OCCUR DURING EXECUTION
5145                                                                  ;OF THE NEXT  INSTRUCTION.
5146 032362  005037  177744                   CLR     CME             ;WRITE TO CME
5147 032366  013701  177744                   MOV     CME,R1          ;SAVE CME CONTENTS.
5148 032372  000240                      25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     032374  000240                           NOP                     ;FOR  LOOP ON ERROR
5149 032376  105037  177750                   CLRB    CMR             ;DISABLE MAINTENANCE MODE
5150 032402  005701                           TST     R1              ;ARE ALL BITS 0?
5151 032404  001406                           BEQ     10$             ;PASS
5152 032406  010137  050520                   MOV     R1,RECDAT       ;GET CME CONTENTS RECEIVED
5153 032412  104413                           ERROR                   ;ERROR
                                                                      ;-----
     032414  032412                           .WORD   .-2
5154                                                                  ;PARITY ERROR CHECK TESTS
5155                                                                  ;WRITING TO CME DID NOT LEAVE ALL PARITY ERROR BITS 0
5156 032416  050520                           RECDAT                  ;PRINT CME CONTENTS RECEIVED
5157 032420  000000                           .WORD   0
5158 032422  000240                      10$:    NOP                     ;END OF TEST
     032424  005237  001472                   INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 170 - CME CAN SHOW NO PARITY ERROR FOLLOWING READ HIT

```
5169                                    .SBTTL  TEST # 170 - CME CAN SHOW NO PARITY ERROR FOLLOWING READ HIT
                                        ;;*****************************************************************
                                        ;*TEST 170       CME CAN SHOW NO PARITY ERROR FOLLOWING READ HIT
                                        ;*      VERIFY THAT CME CAN SHOW NO PARITY ERRORS FOLOWING A READ HIT CONDITION
                                        ;*      VERIFY TAG/DATA 'PARITY CHECK PARITY GENERATORS' WITH ALL 0'S
                                        ;*      ON THEIR INPUTS.
                                        ;*      PROCEDURE:  CREATE ALL 0'S ON THE INPUTS OF THE TAG/DATA
                                        ;*                  PARITY CHECK PARITY GENERATORS DURING A READ
                                        ;*                  HIT CONDITION.ALLOW PARITY INFO. TO BE CLOCKED TO
                                        ;*                  CME.
                                        ;*      RESULT:     CME<15>,<7>,<6>,<5> ALL 0'S
                                        ;;*****************************************************************
     032430                             TST170:
     032430  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     032432  032442                             .WORD   40$             ;TEST START LOCATION
     032434  070016                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     032436  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     032440  070072                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     032442  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     032450  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     032454  032624                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

5170 032456  052737  000400  177746            BIS     #FC,CCR         ;FLUSH CACHE TO INVALIDATE ALL CACHE LOCATIONS
5171 032464  032737  010000  177746  200$:     BIT     #VCIP,CCR       ;WAIT TILL DONE
5172 032472  001374                     BNE     200$
5173 032474  005037  000000            1$:     CLR     0               ;0'S TO MAIN MEMORY LOCATION 0
5174 032500  112737  000002  177750            MOVB    #HODO,CMR       ;HODO ALLOWS CLOCKING OF PARITY INFO TO
5175                                                                     ;CME ONLY DURING THE DESTINATION ACCESS OF
5176                                                                     ;OF AN INSTRUCTION
5177 032506  012737  000015  177746            MOV     #15,CCR         ;NO UCB SO AS TO WRITE CACHE STORES
5178 032514  005737  040000                     TST     40000           ;
5179 032520  005737  000000                     TST     0               ;READ UPDATE TO CACHE LOCATION 0000-
5180                                                                     ;ALL 0'S WILL BE WRITTEN INTO DATA/TAG STORES
5181                                                                     ;AND A 0 INTO DATA/TAG PARITY STORES
5182 032524  005037  177744                     CLR     CME             ;CLEAR CME
5183 032530  005737  000000                     TST     0               ;READ HIT-ALL 0'S WILL BE PLACED ON INPUTS
5184                                                                     ;OF DATA/TAG PARITY DETECT PARITY GENERATORS
5185                                                                     ;AND ALL PARITY INFO WILL BE CLOCKED TO CME
5186 032534  052737  000200  177746            BIS     #PEA,CCR        ;SET CCR<7> SO AS TO ENABLE CME<7>,<6>,<5> TO
5187                                                                     ;TO BE WRITTEN INDIVIDUALLY FROM
5188                                                                     ;PARITY INFO LOGIC,AND TO WRITE  CME<15>.
5189 032542  000240                     NOP
5190 032544  013701  177744                     MOV     CME,R1          ;SAVE CME CONTENTS
5191 032550  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     032552  000240                             NOP                     ;FOR  LOOP ON ERROR
5192 032554  012737  001015  177746            MOV     #OFF,CCR        ;DISABLE CACHE
5193 032562  105037  177750                     CLRB    CMR             ;DISABLE MAINTENANCE MODE
5194 032566  012737  000002  000000            MOV     #2,0            ;RESTORE LOCATION 0
5195 032574  005701                     TST     R1              ;WERE ALL PARITY ERROR BITS IN CME=0?
5196 032576  001411                     BEQ     10$             ;PASS;NEXT TEST
5197 032600  005037  050504                     CLR     EXDAT6          ;SPECIFY CME CONTENTS EXPECTED
5198 032604  010137  050520                     MOV     R1,RECDAT       ;GET CME CONTENTS RECEIVED
5199 032610  104413                     ERROR                           ;ERROR
```

TEST # 170 - CME CAN SHOW NO PARITY ERROR FOLLOWING READ HIT

```
                                                                        ;-----
     032612  032610                          .WORD   .-2
5200                                                                    ;PARITY CHECK TESTS
5201                                                                    ;ALL PARITY ERROR BITS IN CME SHOULD HAVE READ 0
5202 032614  050504                          EXDAT6                     ;PRINT EXPECTED CME CONTENTS
5203 032616  050520                          RECDAT                     ;PRINT CONTENTS OF CME RECEIVED
5204 032620  000000                          .WORD   0
5205 032622  000240                  10$:    NOP                        ;END OF TEST
     032624  005237  001472                  INC     $TESTN             ;INCREMENT TEST COUNTER
```

```
5229                                    .SBTTL  TEST # 171 - PARITY ERROR BIT CHECK
                                        ;;*****************************************************************
                                        ;*TEST 171       PARITY ERROR BIT CHECK
                                        ;*      VERIFY THE FOLLOWING  WHEN A LOCATION PREVIOUSLY WRITTEN
                                        ;*      WITH WRONG TAG PARITY IS ACCESSED:
                                        ;*              1. A PARITY ERROR IS DETECTED AND ALL PARITY ERROR BITS IN
                                        ;*                 CME READ CORRECTLY WITH PEA CLEARED,
                                        ;*              2.  ALL PARITY ERROR ERROR BITS READ CORRECTLY WITH PEA
                                        ;*                 SET.
                                        ;*              3.  A WRITE TO CME CLEARS CME<15> AND <5> FROM A 1 STATE
                                        ;*      PROCEDURE:      WRITE WRONG PARITY TO TAG PARITY STORE LOCATION
                                        ;*                      0000. CLOCK PARITY INFO. TO CME.
                                        ;*      CONDITIONS:     DATA PARITY CHECK PARITY GEN. INPUTS:
                                        ;*                        ALL 0'S
                                        ;*                      TAG PARITY CHECK PAR. GEN. INPUTS:
                                        ;*                        TAGD<20:13>= ALL 0'S
                                        ;*                        TAG PARITY BIT=1
                                        ;*      RESULTS:        PEA CLEARED:
                                        ;*                        CME<15>=0
                                        ;*                        CME<7>,<6>,<5>=1
                                        ;*                      PEA SET:
                                        ;*                        CME<15>=1
                                        ;*                        CME<7>,<6>=0
                                        ;*                        CME<5>=1
                                        ;;*****************************************************************
                                        TST171:
032630
032630  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
032632  032642                                  .WORD   40$             ;TEST START LOCATION
032634  070016                                  .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
032636  000000                                  .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
032640  070126                                  .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
032642  012737  001015  177746  40$:    MOV     #OFF,CCR                ;DISABLE CACHE
032650  004437  002452                  JSR     R4,RELCTH               ;LOCATE TEST CODE TO HIGH CACHE SPACE
032654  033162                          .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

5230 032656  052737  000400  177746  2$:     BIS     #FC,CCR                 ;FLUSH CACHE TO INVALIDATE ALL CACHE LOCATIONS
5231 032664  032737  010000  177746  300$:   BIT     #VCIP,CCR               ;WAIT TILL DONE
5232 032672  001374                  BNE     300$
5233 032674  005037  000000          1$:     CLR     0                       ;0'S TO MAIN MEMORY LOCATION 0.
5234 032700  112737  000002  177750          MOVB    #HODO,CMR               ;HODO ALLOWS CLOCKING OF PARITY INFO TO
5235                                                                         ;CME ONLY DURING THE DESTINATION ACCESS OF
5236                                                                         ;AN INSTRUCTION.
5237 032706  012737  000015  177746          MOV     #15,CCR                 ;NO UCB SO AS TO WRITE CACHE STORES
5238 032714  005737  000000                  TST     0                       ;
5239 032720  005737  040000                  TST     40000                   ;UPDATE CACHE LOCATION 0000 WITH CORRECT PARITY STORAGE
5240 032724  052737  002000  177746          BIS     #WWPT,CCR               ;ALLOW WRITE WRONG PARITY TO TAGG PARITY STORE
5241 032732  005737  000000                  TST     0                       ;READ UPDATE TO CACHE LOCATION 0000;
5242                                                                         ;ALL 0'S(EVEN DATA) WILL BE WRITTEN TO DATA/TAG STORES,
5243                                                                         ;0'S INTO DATA PARITY STORES,AND A 1
5244                                                                         ;INTO TAG PARITY STORE.
5245 032736  042737  002000  177746          BIC     #WWPT,CCR               ;DISABLE WWPT
5246 032744  005037  177744                  CLR     CME                     ;CLEAR CME
5247 032750  005737  000000                  TST     0                       ;READ HIT; ALL 0'S WILL BE PLACED ON INPUTS
```

```
                                                                        ;OF DATA PARITY ERROR CHECK PARITY GEN'S, BUT
                                                                        ;TAG PARITY CHECK GENERATOR WILL
                                                                        ;SEE ODD DATA DUE TO WRONG PARITY
                                                                        ;FROM PREVIOUS READ UPDATE.
 032754  013700  177744                        MOV     CME,R0         ;SAVE PARITY ERROR BITS WITH PEA CLEARED
 032760  052737  000200  177746                BIS     #PEA,CCR       ;SET CCR<7> SO AS TO WRITE CME<7>,<6>,<5> INDIVIDUALLY
                                                                        ;FROM PARITY CHECK LOGIC, AND TO WRITE CME<15>
 032766  000240                                NOP
 032770  013701  177744                        MOV     CME,R1         ;SAVE CME CONTENTS AFTER PEA IS SET.
                                                                        ;LOOKS LIKE EXPECTED TRAP DID NOT OCCUR.
 032774  005037  177744                        CLR     CME            ;CLEAR CME
 033000  013702  177744                        MOV     CME,R2         ;SAVE CME CONTENTS AFTER CLEAR
 033004  000240                      25$:      NOP                    ;INSTRUCTION 'JMP 1$' PLACED HERE
 033006  000240                                NOP                    ;FOR  LOOP ON ERROR
 033010  012737  001015  177746                MOV     #OFF,CCR       ;DISABLE CACHE
 033016  105037  177750                        CLRB    CMR            ;DISABLE MAINT. MODE
 033022  012737  000002  000000                MOV     #2,0           ;RESTORE LOCATION 0
 033030  052737  000400  177746                BIS     #FC,CCR        ;BEFORE LEAVING TEST,FLUSH CACHE TO
                                                                        ;ELIMINATE ANY EFFECTS OF WWPT
 033036  032737  010000  177746  4$:           BIT     #VCIP,CCR      ;WAIT TILL DONE
 033044  001374                                BNE     4$
 033046  022700  000340                        CMP     #340,R0        ;WERE PARITY ERROR BITS CORRECT IN CME
                                                                        ;WITH PEA CLEARED?
 033052  001412                                BEQ     7$             ;YES
 033054  012737  000340  050504                MOV     #340,EXDAT6    ;SPECIFY CME CONTENTS EXPECTED
 033062  010037  050520                        MOV     R0,RECDAT      ;GET CME CONTENTS RECEIVED
 033066  104413                                ERROR                  ;ERROR
                                                                        ;-----
 033070  033066                                .WORD   .-2
                                                                        ;PARITY CHECK TESTS
                                                                        ;PARITY ERROR BITS DID NOT READ CORRECTLY
                                                                        ;WITH PEA CLEARED
 033072  050504                                EXDAT6                 ;PRINT CME CONTENTS EXPECTED
 033074  050520                                RECDAT                 ;PRINT CME CONTENTS RECEIVED
 033076  000000                                .WORD   0
 033100  022701  100040            7$:         CMP     #100040,R1     ;WERE PARITY ERROR BITS CORRECT WITH PEA SET?
 033104  001412                                BEQ     8$             ;YES
 033106  012737  100040  050504                MOV     #100040,EXDAT6 ;SPECIFY CME CONTENTS EXPECTED
 033114  010137  050520                        MOV     R1,RECDAT      ;GET CME CONTENTS RECEIVED
 033120  104413                                ERROR                  ;ERROR
                                                                        ;-----
 033122  033120                                .WORD   .-2
                                                                        ;PARITY CHECK TESTS
                                                                        ;PARITY ERROR BITS DID NOT READ CORRECTLY
                                                                        ;WITH PEA SET.
 033124  050504                                EXDAT6                 ;PRINT CME CONTENTS EXPECTED
 033126  050520                                RECDAT                 ;PRINT CME CONTENTS RECEIVED
 033130  000000                                .WORD   0
 033132  005702                      8$:       TST     R2             ;DID CME CLEAR?
 033134  001411                                BEQ     10$            ;YES
 033136  005037  050504                        CLR     EXDAT6         ;SPECIFY CME CONTENTS EXPECTED
 033142  010237  050520                        MOV     R2,RECDAT      ;GET CME CONTENTS RECEIVED
 033146  104413                                ERROR                  ;ERROR
                                                                        ;-----
 033150  033146                                .WORD   .-2
                                                                        ;PARITY CHECK TESTS
                                                                        ;PARITY ERROR BITS DID NOT CLEAR
```

```
 5298                                                          ;FOLLOWING WRITE TO CME
 5299 033152  050504                        EXDAT6             ;PRINT CME CONTENTS EXPECTED
 5300 033154  050520                        RECDAT             ;PRINT CME CONTENTS RECEIVED
 5301 033156  000000                        .WORD   0
 5302 033160  000240                10$:    NOP                ;END OF TEST
      033162  005237  001472                INC     $TESTN     ;INCREMENT TEST COUNTER
```

```
5329                                    .SBTTL  TEST # 172 - VERIFY WRONG BYTE INFO CAUSES PROPER PARITY ERROR
                                        ;;*****************************************************************
                                        ;*TEST 172      VERIFY WRONG BYTE INFO CAUSES PROPER PARITY ERROR
                                        ;*      VERIFY THE FOLLOWING  WHEN A LOCATION PREVIOUSLY WRITTEN
                                        ;*      WITH WRONG LO & HI BYTE PARITY IS ACCESSED.
                                        ;*              1. A PARITY ERROR IS DETECTED AND ALL PARITY ERROR BITS IN
                                        ;*                 CME READ CORRECTLY WITH PEA CLEARED,
                                        ;*              2.  ALL PARITY ERROR BITS READ CORRECTLY WITH PEA
                                        ;*                 SET.
                                        ;*              3.  A WRITE TO CME CLEARS CME<15> ,<7> AND <6> FROM A 1 STATE
                                        ;*      PROCEDURE:      WRITE WRONG PARITY TO LO BYTE PARITY STORE LOCATION
                                        ;*                      0000. CLOCK PARITY INFO. TO CME.
                                        ;*      CONDITIONS:     HI BYTE PARITY CHECK PARITY GEN. INPUTS:
                                        ;*                        INTD<15:8>=0
                                        ;*                        HI BYTE PARITY BIT=1
                                        ;*                      LO BYTE PAR. CHECK PAR. GEN INPUTS:
                                        ;*                        INTD<7:0>= ALL 0'S
                                        ;*                        LO BYTE PARITY BIT=1
                                        ;*                      TAG PARITY CHECK PARITY GEN. INPUTS:
                                        ;*                        ALL 0'S
                                        ;*      RESULTS:        PEA CLEARED:
                                        ;*                        CME<15>=0
                                        ;*                        CME<7>,<6>,<5>=1
                                        ;*                      PEA SET:
                                        ;*                        CME<15>=1
                                        ;*                        CME<7>,<6>=1
                                        ;*                        CME<5>=0
                                        ;;*****************************************************************
033166                                  TST172:
033166  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
033170  033200                                  .WORD   40$             ;TEST START LOCATION
033172  070016                                  .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
033174  000000                                  .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
033176  070126                                  .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
033200  012737  001015  177746  40$:     MOV     #OFF,CCR                ;DISABLE CACHE
033206  004437  002452                  JSR     R4,RELCTH               ;LOCATE TEST CODE TO HIGH CACHE SPACE
033212  033520                          .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

5330 033214  052737  000400  177746          BIS     #FC,CCR                 ;FLUSH CACHE TO INVALIDATE ALL CACHE LOCATIONS
5331 033222  032737  010000  177746  200$:   BIT     #VCIP,CCR               ;WAIT TILL DONE
5332 033230  001374                  BNE     200$
5333 033232  005037  000000          1$:     CLR     0                       ;0'S TO MAIN MEMORY LOCATION 0.
5334 033236  112737  000002  177750          MOVB    #HODO,CMR               ;HODO ALLOWS CLOCKING OF PARITY INFO ;O
5335                                                                         ;CME ONLY DURING THE DESTINATION ACCESS OF
5336                                                                         ;AN INSTRUCTION.
5337 033244  012737  000015  177746          MOV     #15,CCR                 ;NO UCB SO AS TO WRITE CACHE STORES
5338 033252  005737  000000                  TST     0                       ;
5339 033256  005737  040000                  TST     40000                   ;UPDATE CACHE LOCATION 0000 WITH CORRECT PARITY STORAGE
5340 033262  052737  000100  177746          BIS     #WWPD,CCR               ;ALLOW WRITE WRONG PARITY DATA TO LO
5341                                                                         ;& HI BYTE PARITY STORE.
5342 033270  005737  000000                  TST     0                       ;READ UPDATE TO CACHE LOCATION 0000;
5343                                                                         ;ALL 0'S WILL BE WRITTEN TO DATA/TAG STORES,
5344                                                                         ;1'S INTO LO & HI BYTE DATA PARITY STORES,AND A 0
```

```
5345                                                                    ;INTO TAG PARITY STORE.
5346 033274  042737  000100  177746          BIC     #WWPD,CCR          ;DISABLE WWPD
5347 033302  005037  177744                  CLR     CME                ;CLEAR CME
5348 033306  005737  000000                  TST     0                  ;READ HIT; ALL 0'S(EVEN DATA) WILL BE
5349                                                                    ;PLACED ON INPUTS
5350                                                                    ;OF TAG PARITY ERROR CHECK PARITY GEN'S, BUT
5351                                                                    ;LO & HI BYTE PARITY CHECK GENERATORS WILL
5352                                                                    ;SEE ODD DATA DUE TO WRONG PARITY
5353                                                                    ;FROM PREVIOUS READ UPDATE.
5354 033312  013700  177744                  MOV     CME,R0             ;SAVE PARITY ERROR BITS WITH PEA CLEARED
5355 033316  052737  000200  177746          BIS     #PEA,CCR           ;SET CCR<7> SO AS TO WRITE CME<7>,<6>,<5> INDIVIDUALLY
5356                                                                    ;FROM PARITY CHECK LOGIC, AND TO WRITE CME<15>
5357 033324  000240                          NOP
5358 033326  013701  177744                  MOV     CME,R1             ;SAVE CME CONTENTS AFTER PEA IS SET.
5359                                                                    ;LOOKS LIKE EXPECTED TRAP
5360                                                                    ;DID NOT OCCUR.
5361 033332  005037  177744                  CLR     CME                ;CLEAR CME
5362 033336  013702  177744                  MOV     CME,R2             ;SAVE CME CONTENTS AFTER CLEAR
5363 033342  000240                  25$:    NOP                        ;INSTRUCTION 'JMP 1$' PLACED HERE
     033344  000240                          NOP                        ;FOR  LOOP ON ERROR
5364 033346  012737  001015  177746          MOV     #OFF,CCR           ;DISABLE CACHE
5365 033354  105037  177750                  CLRB    CMR                ;DISABLE MAINT. MODE
5366 033360  012737  000002  000000          MOV     #2,0               ;RESTORE LOCATION 0
5367 033366  052737  000400  177746          BIS     #FC,CCR            ;BEFORE LEAVING TEST FLUSH CACHE TO
5368                                                                    ;ELIMINATE ANY EFFECTS OF WWPD
5369 033374  032737  010000  177746  4$:     BIT     #VCIP,CCR          ;WAIT TILL DONE
5370 033402  001374                          BNE     4$
5371 033404  022700  000340                  CMP     #340,R0            ;WERE PARITY ERROR BITS CORRECT IN CME
5372                                                                    ;WITH PEA CLEARED?
5373 033410  001412                          BEQ     7$                 ;YES
5374 033412  012737  000340  050504          MOV     #340,EXDAT6        ;SPECIFY CME CONTENTS EXPECTED
5375 033420  010037  050520                  MOV     R0,RECDAT          ;GET CME CONTENTS RECEIVED
5376 033424  104413                          ERROR                      ;ERROR
                                                                        ;-----
     033426  033424                          .WORD   .-2
5377                                                                    ;PERITY CHECK TESTS
5378                                                                    ;PARITY ERROR BITS DID NOT READ CORRECTLY
5379                                                                    ;WITH PEA CLEARED
5380 033430  050504                  EXDAT6                             ;PRINT CME CONTENTS EXPECTED
5381 033432  050520                  RECDAT                             ;PRINT CME CONTENTS RECEIVED
5382 033434  000000                          .WORD   0
5383 033436  022701  100300          7$:     CMP     #100300,R1         ;WERE PARITY ERROR BITS CORRECT WITH PEA SET?
5384 033442  001412                          BEQ     8$                 ;YES
5385 033444  012737  100300  050504          MOV     #100300,EXDAT6     ;SPECIFY CME CONTENTS EXPECTED
5386 033452  010137  050520                  MOV     R1,RECDAT          ;GET CME CONTENTS RECEIVED
5387 033456  104413                          ERROR                      ;ERROR
                                                                        ;-----
     033460  033456                          .WORD   .-2
5388                                                                    ;PARITY CHECK TESTS
5389                                                                    ;PARITY ERROR BITS DID NOT READ CORRECTLY
5390                                                                    ;WITH PEA SET.
5391 033462  050504                  EXDAT6                             ;PRINT CME CONTENTS EXPECTED
5392 033464  050520                  RECDAT                             ;PRINT CME CONTENTS RECEIVED
5393 033466  000000                          .WORD   0
5394 033470  005702                  8$:     TST     R2                 ;DID CME CLEAR?
5395 033472  001411                          BEQ     10$                ;YES
5396 033474  005037  050504                  CLR     EXDAT6             ;SPECIFY CME CONTENTS EXPECTED
```

TEST # 172 - VERIFY WRONG BYTE INFO CAUSES PROPER PARITY ERROR

```
5397 033500  010237  050520              MOV     R2,RECDAT       ;GET CME CONTENTS RECEIVED
5398 033504  104413                      ERROR                   ;ERROR
                                                                 ;-----
     033506  033504                      .WORD   .-2
5399                                                             ;PARITY CHECK TESTS
5400                                                             ;PARITY ERROR BITS DID NOT CLEAR
5401                                                             ;FOLLOWING WRITE TO CME
5402 033510  050504                      EXDAT6                  ;PRINT CME CONTENTS EXPECTED
5403 033512  050520                      RECDAT                  ;PRINT CME CONTENTS RECEIVED
5404 033514  000000                      .WORD   0
5405 033516  000240              10$:    NOP                     ;END OF TEST
     033520  005237  001472              INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
5413                                    .SBTTL  TEST # 173 - INT. LOGIC TRAPS ACCESSING LOC WITH BAD PARITY
                                        ;;*****************************************************************
                                        ;*TEST 173       INT. LOGIC TRAPS ACCESSING LOC WITH BAD PARITY
                                        ;*      VERIFY INTERRUPT LOGIC BY ASSURING THAT A TRAP OCCURS TO LOCATION
                                        ;*      114 WHEN A LOCATION PREVIOUSLY WRITTEN
                                        ;*      WITH WRONG HI/LO BYTE PARITY IS ACCESSED.
                                        ;*              CONDITIONS:     PEA=0
                                        ;*                              DCPI=0
                                        ;;*****************************************************************
     033524                             TST173:
     033524  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     033526  033536                             .WORD   40$             ;TEST START LOCATION
     033530  070016                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     033532  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     033534  070152                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     033536  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     033544  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     033550  034010                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

5414 033552  052737  000400  177746            BIS     #FC,CCR         ;FLUSH CACHE TO INVALIDATE ALL CACHE LOCATIONS
5415 033560  032737  010000  177746  200$:     BIT     #VCIP,CCR       ;WAIT TILL DONE
5416 033566  001374                           BNE     200$
5417 033570  005037  000000            1$:     CLR     0               ;0'S TO MAIN MEMORY LOCATION 0.
5418 033574  012737  070142  000114            MOV     #4$-40$+67764,114 ;SETUP FOR CACHE TRAP
5419 033602  012737  000340  000116            MOV     #340,116
5420 033610  112737  000002  177750            MOVB    #HODO,CMR       ;HODO ALLOWS CACHE UPDATES
5421                                                                    ;AND CLOCKING OF PARITY INFO TO INTERRUPT LOGIC
5422                                                                    ; ONLY DURING THE DESTINATION ACCESS OF AN INSTRUCTION.
5423 033616  005037  002070                     CLR     FAIL1           ;CLEAR ERROR FLAG
5424 033622  012737  000015  177746            MOV     #15,CCR         ;NO UCB SO AS TO WRITE CACHE STORES
5425 033630  005737  000000                     TST     0               ;
5426 033634  005737  040000                     TST     40000           ;UPDATE CACHE LOCATION 0000 WITH CORRECT PARITY STORAGE
5427 033640  052737  000100  177746            BIS     #WWPD,CCR       ;ALLOW WRITE WRONG PARITY DATA TO LO
5428                                                                    ;& HI BYTE PARITY STORE.
5429 033646  005737  000000                     TST     0               ;READ UPDATE TO CACHE LOCATION 0000;
5430                                                                    ;WRITE WRONG PARITY TO HI/LO BYTE PARITY STORES
5431 033652  042737  000100  177746            BIC     #WWPD,CCR       ;DISABLE WWPD
5432 033660  005037  177744                     CLR     CME             ;CLEAR CME AND PARITY DETECT LOGIC
5433 033664  042737  000005  177746            BIC     #DCPI+FMLO,CCR  ;ALLOW FOR INTERRUPT TO OCCUR
5434                                                                    ;AND ENABLE LOW CACHE
5435 033672  005737  000000                     TST     0               ;READ HIT;
5436                                                                    ;LO & HI BYTE PARITY CHECK GENERATORS WILL
5437                                                                    ; DETECT  WRONG PARITY AND THE PARITY
5438                                                                    ;ERROR WILL BE CLOCKED TO INTERRUPT
5439                                                                    ;LOGIC
5440 033676  000240                     NOP
5441 033700  005237  002070                     INC     FAIL1           ;INDICATE THAT TRAP DID NOT OCCUR
5442 033704  012737  001015  177746            MOV     #OFF,CCR        ;DISABLE CACHE
5443 033712  000404                     BR      25$
5444 033714  012737  001015  177746  4$:       MOV     #OFF,CCR        ;DISABLE CACHE
5445 033722  022626                     CMP     (SP)+,(SP)+             ;READJUST STACK DUE TO INTERRUPT
5446 033724  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     033726  000240                     NOP                             ;FOR  LOOP ON ERROR
```

TEST # 173 - INT. LOGIC TRAPS ACCESSING LOC WITH BAD PARITY

```
5447 033730  105037  177750              CLRB    CMR             ;DISABLE MAINT. MODE
5448 033734  012737  000002  000000      MOV     #2,0            ;RESTORE LOCATION 0
5449 033742  012737  000116  000114      MOV     #116,114        ;RESTORE CACHE INTERRUPT VECTORS
5450 033750  005037  000116              CLR     116
5451 033754  052737  000400  177746      BIS     #FC,CCR         ;BEFORE LEAVING TEST FLUSH CACHE TO
5452                                                             ;ELIMINATE ANY EFFECTS OF WWPD
5453 033762  032737  010000  177746 500$: BIT     #VCIP,CCR       ;WAIT TILL DONE
5454 033770  001374                      BNE     500$
5455 033772  005737  002070              TST     FAIL1           ;DID TRAP OCCUR?
5456 033776  001403                      BEQ     10$             ;YES
5457 034000  104413                      ERROR                   ;ERROR
                                                                 ;-----
     034002  034000                      .WORD   .-2
5458                                                             ;INTERRUPT/ABORT LOGIC TESTS
5459                                                             ;TRAP TO LOCATION 114 DID NOT OCCUR
5460 034004  000000                      .WORD   0
5461 034006  000240              10$:    NOP                     ;END OF TEST
     034010  005237  001472              INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 174 - VERIFY INTERRUPT LOGIC TRAP CAN BE INHIBITED

```
5469                                    .SBTTL  TEST # 174 - VERIFY INTERRUPT LOGIC TRAP CAN BE INHIBITED
                                        ;;**********************************************************************
                                        ;*TEST 174      VERIFY INTERRUPT LOGIC TRAP CAN BE INHIBITED
                                        ;*      VERIFY INTERRUPT LOGIC BY ASSURING THAT A TRAP CAN BE INHIBITED TO LOCATION
                                        ;*      114 WHEN A LOCATION PREVIOUSLY WRITTEN
                                        ;*      WITH WRONG HI/LO BYTE PARITY IS ACCESSED.
                                        ;*      CONDITIONS:     PEA=0
                                        ;*                      DCPI=1
                                        ;;**********************************************************************
     034014                             TST174:
     034014  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     034016  034026                             .WORD   40$             ;TEST START LOCATION
     034020  070016                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     034022  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     034024  070152                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     034026  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     034034  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     034040  034300                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

5470 034042  052737  000400  177746            BIS     #FC,CCR         ;FLUSH CACHE TO INVALIDATE ALL CACHE LOCATIONS
5471 034050  032737  010000  177746  200$:     BIT     #VCIP,CCR       ;WAIT TILL DONE
5472 034056  001374                           BNE     200$
5473 034060  005037  000000            1$:     CLR     0               ;0'S TO MAIN MEMORY LOCATION 0.
5474 034064  012737  070136  000114            MOV     #4$-40$+67764,114 ;SETUP FOR CACHE TRAP
5475 034072  012737  000340  000116            MOV     #340,116
5476 034100  112737  000002  177750            MOVB    #HODO,CMR       ;HODO ALLOWS CACHE UPDATES
5477                                                                    ;AND CLOCKING OF PARITY INFO TO INTERRUPT LOGIC
5478                                                                    ; ONLY DURING THE DESTINATION ACCESS OF
5479                                                                    ;AN INSTRUCTION.
5480 034106  005037  002070                     CLR     FAIL1           ;CLEAR ERROR FLAG
5481 034112  012737  000015  177746            MOV     #15,CCR         ;NO UCB SO AS TO WRITE CACHE STORES
5482 034120  005737  000000                     TST     0               ;
5483 034124  005737  040000                     TST     40000           ;UPDATE CACHE LOCATION 0000 WITH CORRECT PARITY STORAGE
5484 034130  052737  000100  177746            BIS     #WWPD,CCR       ;ALLOW WRITE WRONG PARITY DATA TO LO
5485                                                                    ;& HI BYTE PARITY STORE.
5486 034136  005737  000000                     TST     0               ;READ UPDATE TO CACHE LOCATION 0000;
5487                                                                    ;WRITE WRONG PARITY TO HI/LO BYTE PARITY STORES
5488 034142  042737  000100  177746            BIC     #WWPD,CCR       ;DISABLE WWPD
5489 034150  005037  177744                     CLR     CME             ;CLEAR CME AND PARITY DETECT LOGIC
5490 034154  042737  000004  177746            BIC     #FMLO,CCR       ;ENABLE LO CACHE
5491 034162  005737  000000                     TST     0               ;READ HIT;
5492                                                                    ;LO & HI BYTE PARITY CHECK GENERATORS WILL
5493                                                                    ; DETECT  WRONG PARITY AND THE PARITY
5494                                                                    ;ERROR WILL BE CLOCKED TO INTERRUPT
5495                                                                    ;LOGIC
5496 034166  000240                           NOP
5497 034170  012737  001015  177746            MOV     #OFF,CCR        ;DISABLE CACHE
5498 034176  000406                           BR      25$
5499 034200  012737  001015  177746  4$:       MOV     #OFF,CCR        ;DISABLE CACHE
5500 034206  005237  002070                     INC     FAIL1           ;INDICATE THAT TRAP OCCURED
5501 034212  022626                           CMP     (SP)+,(SP)+     ;READJUST STACK DUE TO INTERRUPT
5502 034214  000240            25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
     034216  000240                    NOP                             ;FOR  LOOP ON ERROR
```

TEST # 174 - VERIFY INTERRUPT LOGIC TRAP CAN BE INHIBITED

```
5503 034220  105037  177750                CLRB    CMR             ;DISABLE MAINT. MODE
5504 034224  012737  000002  000000        MOV     #2,0            ;RESTORE LOCATION 0
5505 034232  012737  000116  000114        MOV     #116,114        ;RESTORE CACHE INTERRUPT VECTORS
5506 034240  005037  000116                CLR     116
5507 034244  052737  000400  177746        BIS     #FC,CCR         ;BEFORE LEAVING TEST FLUSH CACHE TO
5508                                                               ;ELIMINATE ANY EFFECTS OF WWPD
5509 034252  032737  010000  177746  500$:  BIT     #VCIP,CCR       ;WAIT TILL DONE
5510 034260  001374                        BNE     500$
5511 034262  005737  002070                TST     FAIL1           ;DID TRAP OCCUR?
5512 034266  001403                        BEQ     10$             ;NO
5513 034270  104413                        ERROR                   ;ERROR
                                                                   ;-----
     034272  034270                        .WORD   .-2
5514                                                               ;INTERRUPT/ABORT LOGIC TESTS
5515                                                               ;TRAP TO LOCATION 114  OCCURED
5516                                                               ;AND WAS NOT INHIBITED BY DCPI
5517 034274  000000                        .WORD   0
5518 034276  000240                10$:    NOP                     ;END OF TEST
     034300  005237  001472                INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
5533                                    .SBTTL  TEST # 175 - CME BIT 15 OPERATES PROPERLY & TRAP TO 114 OCCURS
                                        ;;*****************************************************************
                                        ;*TEST 175      CME BIT 15 OPERATES PROPERLY & TRAP TO 114 OCCURS
                                        ;*      VERIFY ABORT LOGIC BY THE FOLLOWING RESULTS WHEN A LOCATION
                                        ;*      PREVIOUSLY WRITTEN WITH WRONG HI/LO BYTE PARITY IS ACCESSED.
                                        ;*              1. CME<15> WILL SET CAUSED BY ABORT SIGNAL BEING ASSERTED
                                        ;*              2. WRITE TO CME WILL CLEAR CME<15>
                                        ;*              3. INSTRUCTION CYCLE WILL BE ABORTED
                                        ;*              4. THE ABORT CAUSES TRAP TO 114
                                        ;*      PROCEDURE:      INHIBIT CLOCKING OF PARITY ERROR SIGNAL TO
                                        ;*                      INTERRUPT LOGIC. ALLOW CME<15> TO BE SET
                                        ;*                      BY ABORT SIGNAL WHICH IS ASSERTED BY PARITY
                                        ;*                      ERROR SIGNAL TO ABORT LOGIC.
                                        ;*      CONDITIONS:     PEA=1
                                        ;*                      DCPI=1
                                        ;;*****************************************************************
034304                                  TST175:
034304  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
034306  034316                                  .WORD   40$             ;TEST START LOCATION
034310  070016                                  .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
034312  000000                                  .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
034314  070174                                  .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
034316  012737  001015  177746  40$:    MOV     #OFF,CCR                ;DISABLE CACHE
034324  004437  002452                  JSR     R4,RELCTH               ;LOCATE TEST CODE TO HIGH CACHE SPACE
034330  034656                          .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

5534 034332  052737  000400  177746          BIS     #FC,CCR            ;FLUSH CACHE TO INVALIDATE ALL CACHE LOCATIONS
5535 034340  032737  010000  177746  200$:   BIT     #VCIP,CCR          ;WAIT TILL DONE
5536 034346  001374                          BNE     200$
5537 034350  005037  000000          1$:     CLR     0                  ;ALL 0'S TO LOCATION 0
5538 034354  005000                          CLR     R0                 ;ADDRESS 0 TO R0
5539 034356  012737  070150  000114          MOV     #4$-40$+67764,114  ;SETUP FOR TRAP
5540 034364  012737  000340  000116          MOV     #340,116
5541 034372  112737  000002  177750          MOVB    #HODO,CMR          ;HODO ALLOWS CACHE UPDATES
5542                                                                    ;AND CLOCKING OF PARITY INFO TO INTERRUPT LOGIC
5543                                                                    ; ONLY DURING THE DESTINATION ACCESS OF
5544                                                                    ;AN INSTRUCTION.
5545 034400  005037  002070                  CLR     FAIL1              ;CLEAR ERROR FLAG
5546 034404  012703  177777                  MOV     #-1,R3             ;ALL 1'S TO R3
5547 034410  012737  000015  177746          MOV     #15,CCR            ;NO UCB SO AS TO WRITE CACHE STORES
5548 034416  005710                          TST     (R0)               ;
5549 034420  005737  040000                  TST     40000              ;UPDATE CACHE LOCATION 0000 WITH CORRECT PARITY STORAGE
5550 034424  052737  000100  177746          BIS     #WWPD,CCR          ;ALLOW WRITE WRONG PARITY DATA TO LO
5551                                                                    ;& HI BYTE PARITY STORE.
5552 034432  005710                          TST     (R0)               ;READ UPDATE TO CACHE LOCATION 0000
5553                                                                    ;WRITE WRONG PARITY TO HI/LO BYTE PARITY STORES
5554 034434  042737  000100  177746          BIC     #WWPD,CCR          ;DISABLE WWPD
5555 034442  005037  177744                  CLR     CME                ;CLEAR CME AND PARITY DETECT LOGIC
5556 034446  042737  000004  177746          BIC     #FMLO,CCR          ; ENABLE LOW CACHE
5557 034454  052737  000200  177746          BIS     #PEA,CCR           ;ALLOW FOR ABORT
5558 034462  011003                          MOV     (R0),R3            ;READ HIT;
5559                                                                    ;LO & HI BYTE PARITY CHECK GENERATORS WILL
5560                                                                    ; DETECT  WRONG PARITY
```

```
5561                                                    ;USING HODO AND SOURCE MODE FOR READING
5562                                                    ;LOCATION 0 WILL INHIBIT PARITY ERROR
5563                                                    ;FROM BEING CLOCKED TO INTERRUPT LOGIC
5564                                                    ;HOWEVER, THE PARITY ERROR SIGNAL
5565                                                    ;WILL CAUSE THE ABORT SIGNAL TO BE
5566                                                    ;ASSERTED.THE ABORT SIGNAL WILL BE
5567                                                    ;CAUSE CME<15> TO BE SET.
5568                                                    ;THIS INSTRUCTION SHOULD BE ABORTED
5569 034464  000240                        NOP
5570 034466  005237  002070                INC     FAIL1           ;INDICATE NO TRAP OCCURED
5571 034472  012737  001015  177746        MOV     #OFF,CCR        ;DISABLE CACHE
5572 034500  000404                        BR      5$
5573 034502  012737  001015  177746  4$:   MOV     #OFF,CCR        ;DISABLE CACHE
5574 034510  022626                        CMP     (SP)+,(SP)+     ;READJUST STACK
5575 034512  013701  177744          5$:   MOV     CME,R1          ;SAVE CME CONTENTS
5576 034516  005037  177744                CLR     CME             ;WRITE TO CME
5577 034522  013702  177744                MOV     CME,R2          ;SAVE CME CONTENTS
5578 034526  000240                  25$:  NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     034530  000240                        NOP                     ;FOR  LOOP ON ERROR
5579 034532  105037  177750                CLRB    CMR             ;DISABLE MAINT. MODE
5580 034536  012737  000002  000000        MOV     #2,0            ;RESTORE VECTORS
5581 034544  012737  000116  000114        MOV     #116,114
5582 034552  005037  000116                CLR     116
5583 034556  052737  000400  177746        BIS     #FC,CCR         ;BEFORE LEAVING TEST FLUSH CACHE TO
5584                                                    ;ELIMINATE ANY EFFECTS OF WWPD
5585 034564  032737  010000  177746  6$:   BIT     #VCIP,CCR       ;WAIT TILL DONE
5586 034572  001374                        BNE     6$
5587 034574  032701  100000                BIT     #CMPE,R1        ;WAS CME<15> SET?
5588 034600  001003                        BNE     7$              ;YES; PASS
5589 034602  104413                        ERROR                   ;ERROR
                                                        ;-----
     034604  034602                        .WORD   .-2
5590                                                    ;INTERRUPT/ABORT LOGIC
5591                                                    ;CME<15> WAS NOT SET DUE TO ABORT
5592                                                    ;SIGNAL
5593 034606  000000                        .WORD   0
5594 034610  032702  100000          7$:   BIT     #CMPE,R2        ;WAS CME<15> CLEARED?
5595 034614  001403                        BEQ     8$              ;YES
5596 034616  104413                        ERROR                   ;ERROR
                                                        ;-----
     034620  034616                        .WORD   .-2
5597                                                    ;INTERRUPT/ABORT TESTS
5598                                                    ;CME<15> WAS NOT CLEARED BY WRITE TO
5599                                                    ; TO CME
5600 034622  000000                        .WORD   0
5601 034624  022703  177777          8$:   CMP     #-1,R3          ;WAS INSTRUCTION ABORTED LEAVING R3 INTACT?
5602 034630  001403                        BEQ     9$              ;YES
5603 034632  104413                        ERROR                   ;ERROR
                                                        ;-----
     034634  034632                        .WORD   .-2
5604                                                    ;INTERRUPT/ABORT TESTS
5605                                                    ;R3 WAS OVERWRITTEN WITH DATA INDICATING
5606                                                    ;THAT INSTRUCTION WAS NOT ABORTED
5607 034636  000000                        .WORD   0
5608 034640  005737  002070          9$:   TST     FAIL1           ;DID TRAP OCCUR
5609 034644  001403                        BEQ     10$             ;YES;PASS
5610 034646  104413                        ERROR                   ;ERROR
```

```
                                                                        ;-----
      034650  034646                            .WORD   .-2
                                                                        ;INTERRUPT/ABORT TESTS
                                                                        ;TRAP DID NOT OCCUR DUE TO ABORT
      034652  000000                            .WORD   0
      034654  000240                    10$:    NOP                     ;END OF TEST
      034656  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 176 - CHK CACHE TAG/DATA PARITY STORE RAM MEMORY IC'S
                                ;;*****************************************************************
                                ;*TEST 176      CHK CACHE TAG/DATA PARITY STORE RAM MEMORY IC'S
                                ;*      VERIFY CACHE TAG/DATA PARITY STORE RAM MEMORY IC'S BY PERFORMING A
                                ;*      MARCH PATTERN TEST TO LOW CACHE AREA OF TAG/DATA PARITY STORE(LOC. 0000-3777)
                                ;*      PROCEDURE:  1. WRITE ALL 0'S TO ALL LO CACHE TAG/DATA PARITY STORE
                                ;*                     RAMS CORRESPONDING TO LOCATIONS 0000-3777
                                ;*                  2. READ 0'S FROM ALL LO CACHE RAMS CORRESPONDING
                                ;*                     TO LOCATION 0000
                                ;*                  3. WRITE ALL 1'S TO ALL RAMS CORRESPONDING TO LOCATION
                                ;*                     0000.
                                ;*                  4. READ 1'S FROM ALL RAMS CORRESPONDING TO LOCATION
                                ;*                     0000.
                                ;*                  5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
                                ;*                     AND UNTIL LOC. 3777 IS REACHED.
                                ;;*****************************************************************
034662                          TST176:
034662  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
034664  034674                        .WORD   40$             ;TEST START LOCATION
034666  070000                        .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
034670  000000                        .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
034672  070126                        .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
034674  012737  001015  177746  40$:  MOV     #OFF,CCR        ;DISABLE CACHE
034702  004437  002452                JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
034706  035310                        .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE

5630 034710  012702  000401    1$:  MOV     #401,R2         ;SETUP R2 WITH PATTERN 401
5631 034714  005037  177752         CLR     CHR             ;LOAD AMR<8:0> WITH ALL 0'S
5632 034720  012700  060000         MOV     #60000,R0       ;ADDRESS 60000 TO R0
5633 034724  005020            2$:  CLR     (R0)+           ;CLEAR ALL LOW CACHE MAIN MEMORY
5634 034726  020027  070000         CMP     R0,#70000
5635 034732  001374                BNE     2$
5636 034734  012700  060000         MOV     #60000,R0       ;1ST ADDRESS LOCATION IN R0
5637 034740  012701  040000         MOV     #40000,R1       ;ADDRESS 40000 IN R1
5638 034744  112737  000003  177750 MOVB    #HODO+TDAR,CMR  ;HODO ALLOWS CACHE UPDATES &  DATA /TAG PARITY
5639                                                        ; STORE BITS TO BE WRITTEN TO
5640                                                        ;CMR<11:9> ONLY DURING THE  DESTINATION
5641                                                        ;ACCESS OF AN INSTRUCTION.
5642                                                        ;TDAR ALLOWS TAG PARITY STORE GENERATOR
5643                                                        ;INPUTS TO BE LOADED FROM AMR<8:0>
5644 034752  012737  000015  177746 MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE PARITY STORE
5645 034760  005721            6$:  TST     (R1)+           ;
5646 034762  005720                 TST     (R0)+           ;WRITE 0'S INTO ALL DATA/TAG PARITY STORE
5647                                                        ;ADDRESS LOCATIONS SPECIFIED BY R0
5648 034764  022700  070000         CMP     #70000,R0       ;DONE?
5649 034770  001373                BNE     6$              ;NO
5650 034772  012737  000001  177752 MOV     #1,CHR          ;LOAD AMR<8:0> BY WRITING TO CHR<8:0>
5651 035000  012700  060000         MOV     #60000,R0       ;ADDR. 60000 TO R0
5652 035004  042737  000001  177750 7$:  BIC     #TDAR,CMR       ;DISABLE TDAR TO ALLOW UPDATE
5653                                                        ;OF CACHE TAG STORE THRU CA<21:13>
5654 035012  005710                 TST     (R0)            ;READ MISS TO CACHE LOCATION SPECIFIED
5655                                                        ;BY R0.  CLOCK TAG/DATA PARITY STORE
5656                                                        ;BITS INTO CMR<11:9>.SHOULD BE ALL 0'S.
```

```
                                                                                ;ALSO CAUSES UPDATE TO CACHE.TAG/DATA
                                                                                ;PARITY STORE LOCATION SHOULD REMAIN
                                                                                ;WITH 0'S.
035014  013705  177750                        MOV     CMR,R5                  ;SAVE CMR CONTENTS
035020  052737  000001  177750                BIS     #TDAR,CMR               ;ENABLE TDAR TO ALLOW TAG PARITY GENERATOR
                                                                                ;INPUTS TO SEE ODD DATA FROM AMR<8:0>
035026  010210                                MOV     R2,(R0)                 ;WRITE HIT CAUSES UPDATE TO CACHE.
                                                                                ;TAG/DATA PARITY STORES WILL BE WRITTEN
                                                                                ;WITH 1'S DUE TO AMR<8:0> ODD DATA
                                                                                ;AND PATTERN 401 FROM R2 BEING PUT
                                                                                ;ONTO PAX DATA LINES RESULTING IN
                                                                                ;ODD DATA FOR LO AND HI BYTE DATA PARITY GENERATORS.
035030  005710                                TST     (R0)                    ;READ MISS.CLOCK TAG/DATA PARITY STORE BITS TO
                                                                                ;CMR<11:9>.SHOULD BE ALL 1'S.
035032  013703  177750                        MOV     CMR,R3                  ;SAVE CMR CONTENTS
035036  000240                        25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
035040  000240                                NOP                             ;FOR  LOOP ON ERROR
035042  042705  170777                        BIC     #170777,R5              ;INTERESTED IN BITS 11:9
035046  005705                                TST     R5                      ;BITS 11:9 SHOULD BE ALL 0'S
035050  001437                                BEQ     8$                      ;PASS
035052  012737  001015  177746                MOV     #OFF,CCR                ;DISABLE CACHE
035060  105037  177750                        CLRB    CMR                     ;CLEAR MAINT. MODE
035064  005037  050510                        CLR     EXDAT1                  ;SPECIFY EXPECTED CACHE TAG/DATA PARITY STORE DATA
035070  010537  050526                        MOV     R5,CMR119               ;SPECIFY CACHE TAG/DATA PARITY STORE DATA RECEIVED
                                                                                ;THRU CMR<11:9>
035074  012737  000011  002062                MOV     #9.,LOOP                ;PREPARE CMR119 FOR TYPEOUT
035102  006237  050526                11$:    ASR     CMR119
035106  042737  100000  050526                BIC     #100000,CMR119
035114  005337  002062                        DEC     LOOP
035120  001370                                BNE     11$
035122  010037  050506                        MOV     R0,CA121                ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATION
035126  006237  050506                        ASR     CA121
035132  104413                                ERROR                           ;ERROR
                                                                                ;-----
035134  035132                                .WORD   .-2
                                                                                ;TAG/DATA PARITY STORE MARCH PATTERN TEST
                                                                                ;READING CACHE TAG/DATA PARITY STORE DATA
                                                                                ;THRU CMR<11:9> DID NOT READ ALL 0'S.
                                                                                ;THIS SUGGESTS THAT A RAM LOCATION
                                                                                ;SPECIFIED BY CA121 WAS OVERWRITTEN
                                                                                ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
                                                                                ;LOCATION.ANY BIT IN CMR119 DATA
                                                                                ;THAT IS A 1 MAY POINT TO A BAD
                                                                                ;CACHE TAG/DATA PARITY STORE RAM.

035136  050510                                EXDAT1                          ;PRINT  EXPECTED CACHE TAG/DATA PARITY STORE DATA
035140  050526                                CMR119                          ;PRINT  CACHE TAG/DATA PARITY STORE RECEIVED
                                                                                ;THRU CMR<11:9>
035142  050506                                CA121                           ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATION
035144  000000                                .WORD   0
035146  000452                                BR      3$                      ;END THE TEST
035150  042703  170777                8$:     BIC     #170777,R3              ;INTERESTED IN BITS 11:9 ONLY
035154  022703  007000                        CMP     #7000,R3                ;BITS 11:9 SHOULD BE ALL 1'S
035160  001440                                BEQ     9$                      ;PASS
035162  012737  001015  177746                MOV     #OFF,CCR                ;DISABLE CACHE
035170  105037  177750                        CLRB    CMR                     ;CLEAR MAINT. MODE
035174  012737  000007  050510                MOV     #7,EXDAT1               ;SPECIFY EXPECTED CACHE TAG/DATA PARITY STORE DATA
```

```
5711 035202  010337  050526                  MOV     R3,CMR119       ;SPECIFY CACHE TAG/DATA PARITY STORE DATA READ
5712                                                                  ;THRU CMR<11:9>
5713 035206  012737  000011  002062          MOV     #9.,LOOP        ;PREPARE CMR119 FOR TYPEOUT
5714 035214  006237  050526          12$:    ASR     CMR119
5715 035220  042737  100000  050526          BIC     #100000,CMR119
5716 035226  005337  002062                  DEC     LOOP
5717 035232  001370                          BNE     12$
5718 035234  010037  050506                  MOV     R0,CA121        ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATION
5719 035240  006237  050506                  ASR     CA121
5720 035244  104413                          ERROR                   ;ERROR
                                                                      ;-----
     035246  035244                          .WORD   .-2
5721                                                                  ;TAG/DATA PARITY STORE MARCH PATTERN TEST
5722                                                                  ;READING CACHE TAG/DATA PARITY STORE DATA
5723                                                                  ;THRU CMR<11:9> DID NOT READ ALL 1'S.
5724                                                                  ;ANY BIT IN CMR119 DATA
5725                                                                  ;THAT IS A 0 MAY POINT TO A BAD
5726                                                                  ;CACHE TAG/DATA PARITY STORE RAM.
5727 035250  050510                          EXDAT1                  ;PRINT  EXPECTED CACHE TAG/DATA PARITY STORE DATA
5728 035252  050526                          CMR119                  ;PRINT CACHE TAG/DATA PARITY STORE DATA READ
5729                                                                  ;THRU CMR<11:9>
5730 035254  050506                          CA121                   ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATION
5731 035256  000000                          .WORD   0
5732 035260  000405                          BR      3$              ;END TEST
5733 035262  062700  000002          9$:     ADD     #2,R0           ;NEXT LOCATION
5734 035266  022700  070000                  CMP     #70000,R0       ;HAS ALL LO CACHE BEEN DONE?
5735 035272  001244                          BNE     7$              ;NO,CONTINUE
5736 035274  012737  001015  177746  3$:     MOV     #OFF,CCR        ;DISABLE CACHE
5737 035302  105037  177750                  CLRB    CMR             ;DISABLE MAINT. MODE
5738 035306  000240                  10$:    NOP                     ;END OF TEST
     035310  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
5753                                    .SBTTL  TEST # 177 - CHK CACHE TAG/DATA PARITY STORE RAM MEMORY IC'S
                                        ;;*****************************************************************
                                        ;*TEST 177      CHK CACHE TAG/DATA PARITY STORE RAM MEMORY IC'S
                                        ;*      VERIFY CACHE TAG/DATA PARITY STORE RAM MEMORY IC'S BY PERFORMING A
                                        ;*      MARCH PATTERN TEST TO HIGH CACHE AREA OF TAG/DATA PARITY STORE(LOC. 4000-7777)
                                        ;*      PROCEDURE:  1. WRITE ALL 0'S TO ALL HI CACHE TAG/DATA PARITY STORE
                                        ;*                     RAMS CORRESPONDING TO LOCATIONS 4000-7777
                                        ;*                  2. READ 0'S FROM ALL HI CACHE RAMS CORRESPONDING
                                        ;*                     TO LOCATION 4000
                                        ;*                  3. WRITE ALL 1'S TO ALL RAMS CORRESPONDING TO LOCATION
                                        ;*                     4000
                                        ;*                  4. READ 1'S FROM ALL RAMS CORRESPONDING TO LOCATION
                                        ;*                     4000
                                        ;*                  5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
                                        ;*                     AND UNTIL LOC. 7777 IS REACHED.
                                        ;;*****************************************************************
      035314                            TST177:
      035314  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      035316  035326                            .WORD   40$             ;TEST START LOCATION
      035320  060000                            .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
      035322  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      035324  060126                            .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
      035326  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
      035334  004437  002424                    JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
      035340  035742                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

5754  035342  012702  000401            1$:     MOV     #401,R2         ;SETUP R2 WITH PATTERN 401
5755  035346  005037  177752                    CLR     CHR             ;LOAD AMR<8:0> WITH ALL 0'S
5756  035352  012700  070000                    MOV     #70000,R0       ;ADDRESS 70000 TO R0
5757  035356  005020                    2$:     CLR     (R0)+           ;CLEAR ALL HIGH CACHE MAIN MEMORY
5758  035360  020027  100000                    CMP     R0,#100000
5759  035364  001374                            BNE     2$
5760  035366  012700  070000                    MOV     #70000,R0       ;1ST ADDRESS LOCATION IN R0
5761  035372  012701  050000                    MOV     #50000,R1       ;ADDRESS 50000 IN R1
5762  035376  112737  000003  177750            MOVB    #HODO+TDAR,CMR  ;HODO ALLOWS CACHE UPDATES &  DATA /TAG PARITY
5763                                                                    ; STORE BITS TO BE WRITTEN TO
5764                                                                    ;CMR<11:9> ONLY DURING THE  DESTINATION
5765                                                                    ;ACCESS OF AN INSTRUCTION.
5766                                                                    ;TDAR ALLOWS TAG PARITY STORE GENERATOR
5767                                                                    ;INPUTS TO BE LOADED FROM AMR<8:0>
5768  035404  012737  000015  177746            MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE PARITY STORE
5769  035412  005721                    6$:     TST     (R1)+           ;
5770  035414  005720                            TST     (R0)+           ;WRITE 0'S INTO ALL DATA/TAG PARITY STORE
5771                                                                    ;ADDRESS LOCATIONS SPECIFIED BY R0
5772  035416  022700  100000                    CMP     #100000,R0      ;DONE?
5773  035422  001373                            BNE     6$              ;NO
5774  035424  012737  000001  177752            MOV     #1,CHR          ;LOAD AMR<8:0> BY WRITING TO CHR<8:0>
5775  035432  012700  070000                    MOV     #70000,R0       ;ADDR. 70000 TO R0
5776  035436  042737  000001  177750  7$:       BIC     #TDAR,CMR       ;DISABLE TDAR TO  ALLOW  UPDATE
5777                                                                    ;OF CACHE TAG STORE THRU CA<21:13>
5778  035444  005710                            TST     (R0)            ;READ MISS TO CACHE LOCATION SPECIFIED
5779                                                                    ;BY R0.  CLOCK TAG/DATA PARITY STORE
5780                                                                    ;BITS INTO CMR<11:9>.SHOULD BE ALL 0'S.
```

```
                                                                ;ALSO CAUSES UPDATE TO CACHE.TAG/DATA
                                                                ;PARITY STORE LOCATION SHOULD REMAIN
                                                                ;WITH 0'S.
035446  013705  177750          MOV     CMR,R5                 ;SAVE CMR CONTENTS
035452  052737  000001  177750  BIS     #TDAR,CMR              ;ENABLE TDAR TO  ALLOW  TAG PARITY GENERATOR
                                                                ;INPUTS TO SEE ODD DATA FROM AMR<8:0>
035460  010210                  MOV     R2,(R0)                ;WRITE HIT CAUSES UPDATE TO CACHE.
                                                                ;TAG/DATA PARITY STORES WILL BE WRITTEN
                                                                ;WITH 1'S DUE TO AMR<8:0> ODD DATA
                                                                ;AND PATTERN 401 FROM R2 BEING PUT
                                                                ;ONTO PAX DATA LINES RESULTING IN
                                                                ;ODD DATA FOR LO AND HI BYTE DATA PARITY
                                                                ;GENERATORS.
035462  005710                  TST     (R0)                   ;READ MISS.CLOCK TAG/DATA PARITY STORE BITS TO
                                                                ;CMR<11:9>.SHOULD BE ALL 1'S.
035464  013703  177750          MOV     CMR,R3                 ;SAVE CMR CONTENTS
035470  000240          25$:    NOP                            ;INSTRUCTION 'JMP 1$' PLACED HERE
035472  000240                  NOP                            ;FOR  LOOP ON ERROR
035474  042705  170777          BIC     #170777,R5             ;INTERESTED IN BITS 11:9
035500  005705                  TST     R5                     ;BITS 11:9 SHOULD BE ALL 0'S
035502  001437                  BEQ     8$                     ;PASS
035504  012737  001015  177746  MOV     #OFF,CCR               ;DISABLE CACHE
035512  105037  177750          CLRB    CMR                    ;CLEAR MAINT. MODE
035516  005037  050510          CLR     EXDAT1                 ;SPECIFY EXPECTED CACHE TAG/DATA PARITY STORE DATA
035522  010537  050526          MOV     R5,CMR119              ;SPECIFY CACHE TAG/DATA PARITY STORE DATA RECEIVED
                                                                ;THRU CMR<11:9>
035526  012737  000011  002062  MOV     #9.,LOOP               ;PREPARE CMR119 FOR TYPEOUT
035534  006237  050526  11$:    ASR     CMR119
035540  042737  100000  050526  BIC     #100000,CMR119
035546  005337  002062          DEC     LOOP
035552  001370                  BNE     11$
035554  010037  050506          MOV     R0,CA121               ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATION
035560  006237  050506          ASR     CA121
035564  104413                  ERROR                          ;ERROR
                                                               ;-----
035566  035564                  .WORD   .-2
                                                                ;TAG/DATA PARITY STORE MARCH PATTERN TEST
                                                                ;READING CACHE TAG/DATA PARITY STORE DATA
                                                                ;THRU CMR<11:9> DID NOT READ ALL 0'S.
                                                                ;THIS SUGGESTS THAT A RAM LOCATION
                                                                ;SPECIFIED BY CA121 WAS OVERWRITTEN
                                                                ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
                                                                ;LOCATION.ANY BIT IN CMR119 DATA
                                                                ;THAT IS A 1 MAY POINT TO A BAD
                                                                ;CACHE TAG/DATA PARITY STORE RAM.
035570  050510                  EXDAT1                         ;PRINT  EXPECTED CACHE TAG/DATA PARITY STORE DATA
035572  050526                  CMR119                         ;PRINT  CACHE TAG/DATA PARITY STORE RECEIVED
                                                               ;THRU CMR<11:9>
035574  050506                  CA121                          ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATION
035576  000000                  .WORD   0
035600  000452                  BR      3$                     ;END THE TEST
035602  042703  170777  8$:     BIC     #170777,R3             ;INTERESTED IN BITS 11:9 ONLY
035606  022703  007000          CMP     #7000,R3               ;BITS 11:9 SHOULD BE ALL 1'S
035612  001440                  BEQ     9$                     ;PASS
035614  012737  001015  177746  MOV     #OFF,CCR               ;DISABLE CACHE
035622  105037  177750          CLRB    CMR                    ;CLEAR MAINT. MODE
```

```
5835 035626  012737  000007  050510          MOV     #7,EXDAT1       ;SPECIFY EXPECTED CACHE TAG/DATA PARITY STORE DATA
5836 035634  010337  050526                  MOV     R3,CMR119       ;SPECIFY CACHE TAG/DATA PARITY STORE DATA READ
5837                                                                 ;THRU CMR<11:9>
5838 035640  012737  000011  002062          MOV     #9.,LOOP        ;PREPARE CMR119 FOR TYPEOUT
5839 035646  006237  050526          12$:    ASR     CMR119
5840 035652  042737  100000  050526          BIC     #100000,CMR119
5841 035660  005337  002062                  DEC     LOOP
5842 035664  001370                          BNE     12$
5843 035666  010037  050506                  MOV     R0,CA121        ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATION
5844 035672  006237  050506                  ASR     CA121
5845 035676  104413                          ERROR                   ;ERROR
                                                                     ;-----
     035700  035676                          .WORD   .-2
5846                                                                 ;TAG/DATA PARITY STORE MARCH PATTERN TEST
5847                                                                 ;READING CACHE TAG/DATA PARITY STORE DATA
5848                                                                 ;THRU CMR<11:9> DID NOT READ ALL 1'S.
5849                                                                 ;ANY BIT IN CMR119 DATA
5850                                                                 ;THAT IS A 0 MAY POINT TO A BAD
5851                                                                 ;CACHE TAG/DATA PARITY STORE RAM.
5852
5853 035702  050510                  EXDAT1                         ;PRINT  EXPECTED CACHE TAG/DATA PARITY STORE DATA
5854 035704  050526                  CMR119                         ;PRINT CACHE TAG/DATA PARITY STORE DATA READ
5855                                                                 ;THRU CMR<11:9>
5856 035706  050506                  CA121                          ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATION
5857 035710  000000                  .WORD   0
5858 035712  000405                  BR      3$                     ;END TEST
5859 035714  062700  000002          9$:     ADD     #2,R0          ;NEXT LOCATION
5860 035720  022700  100000                  CMP     #100000,R0     ;HAS ALL HI CACHE BEEN DONE?
5861 035724  001244                          BNE     7$             ;NO,CONTINUE
5862 035726  012737  001015  177746  3$:     MOV     #OFF,CCR       ;DISABLE CACHE
5863 035734  105037  177750                  CLRB    CMR            ;DISABLE MAINT. MODE
5864 035740  000240                  10$:    NOP                    ;END OF TEST
     035742  005237  001472                  INC     $TESTN         ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 200 - VERIFY CACHE VALID STORE RAM MEMORY IC'S
                                ;;*****************************************************************
                                ;*TEST 200      VERIFY CACHE VALID STORE RAM MEMORY IC'S
                                ;*      VERIFY CACHE VALID STORE RAM MEMORY IC'S BY PERFORMING A
                                ;*      MARCH PATTERN TEST TO LOW CACHE AREA OF VALID STORE(LOC. 0000-3777)
                                ;*      PROCEDURE:  1. WRITE 0'S  TO LO CACHE VALID STORE
                                ;*                     RAM CORRESPONDING TO LOCATIONS 0000-3777
                                ;*                  2. READ 0 FROM  LO CACHE RAM CORRESPONDING
                                ;*                     TO LOCATION 0000
                                ;*                  3. WRITE  1 TO  RAM CORRESPONDING TO LOCATION
                                ;*                     0000.
                                ;*                  4. READ 1 FROM  RAM CORRESPONDING TO LOCATION
                                ;*                     0000.
                                ;*                  5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
                                ;*                     AND UNTIL LOC. 3777 IS REACHED.
                                ;;*****************************************************************
     035746                     TST200:
     035746  000004                     SCPCND                      ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
     035750  035760                     .WORD   40$                 ;TEST START LOCATION
     035752  070026                     .WORD   1$-40$+67764        ;LOOP ON ERROR START LOCATION
     035754  000000                     .WORD   0                   ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     035756  070136                     .WORD   25$-40$+67764       ;LOOP ON ERROR END LOCATION
     035760  012737  001015  177746 40$: MOV     #OFF,CCR           ;DISABLE CACHE
     035766  004437  002452             JSR     R4,RELCTH          ;LOCATE TEST CODE TO HIGH CACHE SPACE
     035772  036276                     .WORD   10$+2              ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE

5880 035774  032737  020000  177746         BIT     #VSIU,CCR      ;IS SET A USED
5881 036002  001407                         BEQ     1$             ;YES
5882 036004  052737  000400  177746         BIS     #FC,CCR        ;FLUSH
5883 036012  032737  010000  177746 200$:   BIT     #VCIP,CCR
5884 036020  001374                         BNE     200$
5885 036022  012700  060000          1$:    MOV     #60000,R0      ;1ST ADDRESS LOCATION IN R0
5886 036026  012701  040000                 MOV     #40000,R1      ;ADDRESS 40000 IN R1
5887 036032  005002                         CLR     R2
5888 036034  112737  000002  177750         MOVB    #HODO,CMR      ;HODO ALLOWS CACHE UPDATES &  VALID
5889                                                                ; STORE BITS TO BE WRITTEN TO
5890                                                                ;CMR<12> ONLY DURING THE  DESTINATION
5891                                                                ;ACCESS OF AN INSTRUCTION.
5892                                                                ;STORE
5893 036042  012737  000015  177746         MOV     #15,CCR        ;NO UCB SO AS TO UPDATE VALID STORE
5894 036050  005721                 6$:     TST     (R1)+          ;
5895 036052  005720                         TST     (R0)+          ;UPDATE ALL LO CACHE VALID STORE
5896                                                                ;ADDRESS LOCATIONS SPECIFIED BY R0
5897 036054  022700  070000                 CMP     #70000,R0      ;DONE?
5898 036060  001373                         BNE     6$             ;NO
5899 036062  012700  060000                 MOV     #60000,R0      ;ADDR. 60000 TO R0
5900 036066  052737  001000  177746         BIS     #UCB,CCR       ;ENABLE UCB
5901 036074  010220                 13$:    MOV     R2,(R0)+       ;WRITE HIT WITH UCB WILL INVALIDATE
5902                                                                ;OR WRITE 0 TO ALL LO CACHE VALID STORE
5903 036076  022700  070000                 CMP     #70000,R0      ;DONE?
5904 036102  001374                         BNE     13$            ;NO
5905 036104  042737  001000  177746         BIC     #UCB,CCR       ;DISABLE UCB SO AS TO ALLOW VALID STORE UPDATES
5906 036112  012700  060000                 MOV     #60000,R0      ;ADDRESS 60000 TO R0
```

```
5907 036116  005710                7$:   TST   (R0)          ;READ MISS TO CACHE LOCATION SPECIFIED
5908                                                          ;BY R0.  CLOCK VALID STORE
5909                                                          ;BIT INTO CMR<12>.SHOULD BE 0.
5910                                                          ;ALSO CAUSES UPDATE TO CACHE.
5911                                                          ;VALID STORE LOCATION WILL BE WRITTEN WITH A 1.
5912 036120  013705  177750                MOV   CMR,R5      ;SAVE CMR CONTENTS
5913 036124  005710                        TST   (R0)        ;READ HIT.CLOCK VALID STORE BIT TO CMR<12> SHOULD BE 1.
5914 036126  013703  177750                MOV   CMR,R3      ;SAVE CMR CONTENTS
5915 036132  000240                25$:    NOP               ;INSTRUCTION 'JMP 1$' PLACED HERE
     036134  000240                        NOP               ;FOR  LOOP ON ERROR
5916 036136  042705  167777                BIC   #167777,R5  ;INTERESTED IN BIT 12
5917 036142  005705                        TST   R5          ;BIT 12 SHOULD BE 0
5918 036144  001416                        BEQ   8$          ;PASS
5919 036146  012737  001015  177746        MOV   #OFF,CCR    ;DISABLE CACHE
5920 036154  105037  177750                CLRB  CMR         ;CLEAR MAINT. MODE
5921 036160  010037  050506                MOV   R0,CA121    ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
5922 036164  006237  050506                ASR   CA121
5923 036170  104413                        ERROR             ;ERROR
                                                             ;-----
     036172  036170                        .WORD  .-2
5924                                                          ;VALID STORE MARCH PATTERN TEST- SET A
5925                                                          ;READING CACHE VALID STORE DATA
5926                                                          ;THRU CMR<12> DID NOT READ  0.
5927                                                          ;THIS SUGGESTS THAT A RAM LOCATION
5928                                                          ;SPECIFIED BY CA121 WAS OVERWRITTEN
5929                                                          ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
5930                                                          ;LOCATION.
5931                                                          ;THIS INDICATES THAT VALID STORE RAM
5932                                                          ;SET A IS BAD.
5933
5934 036174  050506                        CA121             ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
5935 036176  000000                        .WORD  0
5936 036200  000430                        BR     3$         ;END THE TEST
5937 036202  042703  167777          8$:   BIC    #167777,R3 ;INTERESTED IN BIT 12 ONLY
5938 036206  022703  010000                CMP    #10000,R3  ;BIT 12 SHOULD BE 1
5939 036212  001416                        BEQ    9$         ;PASS
5940 036214  012737  001015  177746        MOV    #OFF,CCR   ;DISABLE CACHE
5941 036222  105037  177750                CLRB   CMR        ;CLEAR MAINT. MODE
5942 036226  010037  050506                MOV    R0,CA121   ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
5943 036232  006237  050506                ASR    CA121
5944 036236  104413                        ERROR             ;ERROR
                                                             ;-----
     036240  036236                        .WORD  .-2
5945                                                          ;VALID STORE MARCH PATTERN TEST- SET A
5946                                                          ;READING CACHE VALID STORE DATA
5947                                                          ;THRU CMR<12> DID NOT READ  1.
5948                                                          ;THIS SUGGESTS THAT VALID STORE RAM
5949                                                          ;IC SET A IS BAD.
5950                                                          ;THRU CMR<12>
5951 036242  050506                        CA121             ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
5952 036244  000000                        .WORD  0
5953 036246  000405                        BR     3$         ;END TEST
5954 036250  062700  000002          9$:   ADD    #2,R0      ;NEXT LOCATION
5955 036254  022700  070000                CMP    #70000,R0  ;HAS ALL LO CACHE BEEN DONE?
5956 036260  001316                        BNE    7$         ;NO,CONTINUE
5957 036262  012737  001015  177746  3$:   MOV    #OFF,CCR   ;DISABLE CACHE
5958 036270  105037  177750                CLRB   CMR        ;DISABLE MAINT. MODE
```

```
 5959 036274  000240                10$:    NOP                     ;END OF TEST
      036276  005237  001472                INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
5974                                    .SBTTL  TEST # 201 - VERIFY CACHE VALID STORE RAM MEMORY IC'S
                                        ;;*****************************************************************
                                        ;*TEST 201      VERIFY CACHE VALID STORE RAM MEMORY IC'S
                                        ;*      VERIFY CACHE VALID STORE RAM MEMORY IC'S BY PERFORMING A
                                        ;*      MARCH PATTERN TEST TO HIGH CACHE AREA OF VALID STORE(LOC. 4000-7777)
                                        ;*      PROCEDURE:  1. WRITE 0'S  TO HI CACHE VALID STORE
                                        ;*                     RAM CORRESPONDING TO LOCATIONS 4000-7777
                                        ;*                  2. READ 0 FROM  HI CACHE RAM CORRESPONDING
                                        ;*                     TO LOCATION 4000
                                        ;*                  3. WRITE  1 TO  RAM CORRESPONDING TO LOCATION
                                        ;*                     4000
                                        ;*                  4. READ 1 FROM  RAM CORRESPONDING TO LOCATION
                                        ;*                     4000
                                        ;*                  5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
                                        ;*                     AND UNTIL LOC. 7777 IS REACHED.
                                        ;;*****************************************************************
      036302                            TST201:
      036302  000004                           SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      036304  036314                            .WORD   40$             ;TEST START LOCATION
      036306  060026                            .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
      036310  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      036312  060136                            .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
      036314  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
      036322  004437  002424                    JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
      036326  036632                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

5975  036330  032737  020000  177746            BIT     #VSIU,CCR       ;IS SET A USED
5976  036336  001407                            BEQ     1$              ;YES
5977  036340  052737  000400  177746            BIS     #FC,CCR         ;FLUSH
5978  036346  032737  010000  177746  200$:     BIT     #VCIP,CCR
5979  036354  001374                            BNE     200$
5980  036356  012700  070000          1$:       MOV     #70000,R0       ;1ST ADDRESS LOCATION IN R0
5981  036362  012701  050000                    MOV     #50000,R1       ;ADDRESS 50000 IN R1
5982  036366  005002                            CLR     R2
5983  036370  112737  000002  177750            MOVB    #HODO,CMR       ;HODO ALLOWS CACHE UPDATES &  VALID
5984                                                                    ; STORE BITS TO BE WRITTEN TO
5985                                                                    ;CMR<12> ONLY DURING THE  DESTINATION
5986                                                                    ;ACCESS OF AN INSTRUCTION. STORE
5987  036376  012737  000015  177746            MOV     #15,CCR         ;NO UCB SO AS TO UPDATE VALID STORE
5988  036404  005721                  6$:       TST     (R1)+           ;
5989  036406  005720                            TST     (R0)+           ;UPDATE ALL HI CACHE VALID STORE
5990                                                                    ;ADDRESS LOCATIONS SPECIFIED BY R0
5991  036410  022700  100000                    CMP     #100000,R0      ;DONE?
5992  036414  001373                            BNE     6$              ;NO
5993  036416  012700  070000                    MOV     #70000,R0       ;ADDR. 70000 TO R0
5994  036422  052737  001000  177746            BIS     #UCB,CCR        ;ENABLE UCB
5995  036430  010220                  13$:      MOV     R2,(R0)+        ;WRITE HIT WITH UCB WILL INVALIDATE
5996                                                                    ;OR WRITE 0 TO ALL HI CACHE VALID STORE
5997  036432  022700  100000                    CMP     #100000,R0      ;DONE?
5998  036436  001374                            BNE     13$             ;NO
5999  036440  042737  001000  177746            BIC     #UCB,CCR        ;DISABLE UCB SO AS TO ALLOW VALID STORE UPDATES
6000  036446  012700  070000                    MOV     #70000,R0       ;ADDRESS 70000 TO R0
6001  036452  005710                  7$:       TST     (R0)            ;READ MISS TO CACHE LOCATION SPECIFIED
```

```
                                                                ;BY R0.  CLOCK VALID STORE
                                                                ;BIT INTO CMR<12>.SHOULD BE 0.
                                                                ;ALSO CAUSES UPDATE TO CACHE.
                                                                ;VALID STORE LOCATION WILL BE WRITTEN WITH A 1.
6006 036454  013705  177750            MOV     CMR,R5          ;SAVE CMR CONTENTS
6007 036460  005710                    TST     (R0)            ;READ HIT.CLOCK VALID STORE BIT TO CMR<12>
6008                                                            ;SHOULD BE 1.
6009 036462  013703  177750            MOV     CMR,R3          ;SAVE CMR CONTENTS
6010 036466  000240            25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     036470  000240                    NOP                     ;FOR  LOOP ON ERROR
6011 036472  042705  167777            BIC     #167777,R5      ;INTERESTED IN BIT 12
6012 036476  005705                    TST     R5              ;BIT 12 SHOULD BE 0
6013 036500  001416                    BEQ     8$              ;PASS
6014 036502  012737  001015  177746    MOV     #OFF,CCR        ;DISABLE CACHE
6015 036510  105037  177750            CLRB    CMR             ;CLEAR MAINT. MODE
6016 036514  010037  050506            MOV     R0,CA121        ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
6017 036520  006237  050506            ASR     CA121
6018 036524  104413                    ERROR                   ;ERROR
                                                                ;-----
     036526  036524                    .WORD   .-2
6019                                                            ;VALID STORE MARCH PATTERN TEST- SET A
6020                                                            ;READING CACHE VALID STORE DATA
6021                                                            ;THRU CMR<12> DID NOT READ  0.
6022                                                            ;THIS SUGGESTS THAT A RAM LOCATION
6023                                                            ;SPECIFIED BY CA121 WAS OVERWRITTEN
6024                                                            ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
6025                                                            ;LOCATION.
6026                                                            ;THIS INDICATES THAT VALID STORE RAM SET A IS BAD.
6027 036530  050506                    CA121                   ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
6028 036532  000000                    .WORD   0
6029 036534  000430                    BR      3$              ;END THE TEST
6030 036536  042703  167777    8$:     BIC     #167777,R3      ;INTERESTED IN BIT 12 ONLY
6031 036542  022703  010000            CMP     #10000,R3       ;BIT 12 SHOULD BE 1
6032 036546  001416                    BEQ     9$              ;PASS
6033 036550  012737  001015  177746    MOV     #OFF,CCR        ;DISABLE CACHE
6034 036556  105037  177750            CLRB    CMR             ;CLEAR MAINT. MODE
6035 036562  010037  050506            MOV     R0,CA121        ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
6036 036566  006237  050506            ASR     CA121
6037 036572  104413                    ERROR                   ;ERROR
                                                                ;-----
     036574  036572                    .WORD   .-2
6038                                                            ;VALID STORE MARCH PATTERN TEST- SET A
6039                                                            ;READING CACHE VALID STORE DATA
6040                                                            ;THRU CMR<12> DID NOT READ  1.
6041                                                            ;THIS SUGGESTS THAT VALID STORE RAM
6042                                                            ;IC SET A IS BAD.
6043                                                            ;THRU CMR<12>
6044 036576  050506                    CA121                   ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
6045 036600  000000                    .WORD   0
6046 036602  000405                    BR      3$              ;END TEST
6047 036604  062700  000002    9$:     ADD     #2,R0           ;NEXT LOCATION
6048 036610  022700  100000            CMP     #100000,R0      ;HAS ALL HI CACHE BEEN DONE?
6049 036614  001316                    BNE     7$              ;NO,CONTINUE
6050 036616  012737  001015  177746    MOV     #OFF,CCR        ;DISABLE CACHE
6051 036624  105037  177750    3$:     CLRB    CMR             ;DISABLE MAINT. MODE
6052 036630  000240            10$:    NOP                     ;END OF TEST
     036632  005237  001472            INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
6067                                    .SBTTL  TEST # 202 - VERIFY CACHE VALID STORE RAM MEMORY IC'S
                                        ;;*****************************************************************
                                        ;*TEST 202      VERIFY CACHE VALID STORE RAM MEMORY IC'S
                                        ;*      VERIFY CACHE VALID STORE RAM MEMORY IC'S BY PERFORMING A
                                        ;*      MARCH PATTERN TEST TO LOW CACHE AREA OF VALID STORE(LOC. 0000-3777)
                                        ;*      PROCEDURE:  1. WRITE 0'S  TO LO CACHE VALID STORE
                                        ;*                     RAM CORRESPONDING TO LOCATIONS 0000-3777
                                        ;*                  2. READ 0 FROM  LO CACHE RAM CORRESPONDING
                                        ;*                     TO LOCATION 0000
                                        ;*                  3. WRITE  1 TO  RAM CORRESPONDING TO LOCATION
                                        ;*                     0000.
                                        ;*                  4. READ 1 FROM  RAM CORRESPONDING TO LOCATION
                                        ;*                     0000.
                                        ;*                  5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
                                        ;*                     AND UNTIL LOC. 3777 IS REACHED.
                                        ;;*****************************************************************
036636                                  TST202:
036636  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
036640  036650                                  .WORD   40$             ;TEST START LOCATION
036642  070026                                  .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
036644  000000                                  .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
036646  070136                                  .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
036650  012737  001015  177746  40$:    MOV     #OFF,CCR                ;DISABLE CACHE
036656  004437  002452                  JSR     R4,RELCTH               ;LOCATE TEST CODE TO HIGH CACHE SPACE
036662  037166                          .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

6068 036664  032737  020000  177746          BIT     #VSIU,CCR          ;IS SET B USED
6069 036672  001007                          BNE     1$                 ;YES
6070 036674  052737  000400  177746          BIS     #FC,CCR            ;FLUSH
6071 036702  032737  010000  177746  200$:   BIT     #VCIP,CCR
6072 036710  001374                          BNE     200$
6073 036712  012700  060000          1$:     MOV     #60000,R0          ;1ST ADDRESS LOCATION IN R0
6074 036716  012701  040000                  MOV     #40000,R1          ;ADDRESS 40000 IN R1
6075 036722  005002                          CLR     R2
6076 036724  112737  000002  177750          MOVB    #HODO,CMR          ;HODO ALLOWS CACHE UPDATES &  VALID
6077                                                                    ; STORE BITS TO BE WRITTEN TO
6078                                                                    ;CMR<12> ONLY DURING THE  DESTINATION
6079                                                                    ;ACCESS OF AN INSTRUCTION.  STORE
6080 036732  012737  000015  177746          MOV     #15,CCR            ;NO UCB SO AS TO UPDATE VALID STORE
6081 036740  005721                  6$:     TST     (R1)+              ;
6082 036742  005720                          TST     (R0)+              ;UPDATE ALL LO CACHE VALID STORE
6083                                                                    ;ADDRESS LOCATIONS SPECIFIED BY R0
6084 036744  022700  070000                  CMP     #70000,R0          ;DONE?
6085 036750  001373                          BNE     6$                 ;NO
6086 036752  012700  060000                  MOV     #60000,R0          ;ADDR. 60000 TO R0
6087 036756  052737  001000  177746          BIS     #UCB,CCR           ;ENABLE UCB
6088 036764  010220                  13$:    MOV     R2,(R0)+           ;WRITE HIT WITH UCB WILL INVALIDATE
6089                                                                    ;OR WRITE 0 TO ALL LO CACHE VALID STORE
6090 036766  022700  070000                  CMP     #70000,R0          ;DONE?
6091 036772  001374                          BNE     13$                ;NO
6092 036774  042737  001000  177746          BIC     #UCB,CCR           ;DISABLE UCB SO AS TO ALLOW VALID STORE UPDATES
6093 037002  012700  060000                  MOV     #60000,R0          ;ADDRESS 60000 TO R0
6094 037006  005710                  7$:     TST     (R0)               ;READ MISS TO CACHE LOCATION SPECIFIED
```

```
6095                                                                    ;BY R0.  CLOCK VALID STORE
6096                                                                    ;BIT INTO CMR<12>.SHOULD BE 0.
6097                                                                    ;ALSO CAUSES UPDATE TO CACHE.
6098                                                                    ;VALID STORE LOCATION WILL BE WRITTEN WITH A 1.
6099 037010  013705  177750            MOV     CMR,R5                  ;SAVE CMR CONTENTS
6100 037014  005710                    TST     (R0)                    ;READ HIT.CLOCK VALID STORE BIT TO CMR<12>
6101                                                                    ;SHOULD BE 1.
6102 03701o  013703  177750            MOV     CMR,R3                  ;SAVE CMR CONTENTS
6103 037022  000240            25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
     037024  000240                    NOP                             ;FOR  LOOP ON ERROR
6104 037026  042705  167777            BIC     #167777,R5              ;INTERESTED IN BIT 12
6105 037032  005705                    TST     R5                      ;BIT 12 SHOULD BE 0
6106 037034  001416                    BEQ     8$                      ;PASS
6107 037036  012737  001015  177746    MOV     #OFF,CCR                ;DISABLE CACHE
6108 037044  105037  177750            CLRB    CMR                     ;CLEAR MAINT. MODE
6109 037050  010037  050506            MOV     R0,CA121                ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
6110 037054  006237  050506            ASR     CA121
6111 037060  104413                    ERROR                           ;ERROR
                                                                        ;-----
     037062  037060                    .WORD   .-2
6112                                                                    ;VALID STORE MARCH PATTERN TEST- SET B
6113                                                                    ;READING CACHE VALID STORE DATA
6114                                                                    ;THRU CMR<12> DID NOT READ  0.
6115                                                                    ;THIS SUGGESTS THAT A RAM LOCATION
6116                                                                    ;SPECIFIED BY CA121 WAS OVERWRITTEN
6117                                                                    ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
6118                                                                    ;LOCATION.
6119                                                                    ;THIS INDICATES THAT VALID STORE RAM
6120                                                                    ;SET B IS BAD.
6121
6122 037064  050506                    CA121                           ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
6123 037066  000000                    .WORD   0
6124 037070  000430                    BR      3$                      ;END THE TEST
6125 037072  042703  167777    8$:     BIC     #167777,R3              ;INTERESTED IN BIT 12 ONLY
6126 037076  022703  010000            CMP     #10000,R3               ;BIT 12 SHOULD BE 1
6127 037102  001416                    BEQ     9$                      ;PASS
6128 037104  012737  001015  177746    MOV     #OFF,CCR                ;DISABLE CACHE
6129 037112  105037  177750            CLRB    CMR                     ;CLEAR MAINT. MODE
6130 037116  010037  050506            MOV     R0,CA121                ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
6131 037122  006237  050506            ASR     CA121
6132 037126  104413                    ERROR                           ;ERROR
                                                                        ;-----
     037130  037126                    .WORD   .-2
6133                                                                    ;VALID STORE MARCH PATTERN TEST- SET B
6134                                                                    ;READING CACHE VALID STORE DATA
6135                                                                    ;THRU CMR<12> DID NOT READ  1.
6136                                                                    ;THIS SUGGESTS THAT VALID STORE RAM
6137                                                                    ;IC SET B IS BAD.
6138
6139                                                                    ;THRU CMR<12>
6140 037132  050506                    CA121                           ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
6141 037134  000000                    .WORD   0
6142 037136  000405                    BR      3$                      ;END TEST
6143 037140  062700  000002    9$:     ADD     #2,R0                   ;NEXT LOCATION
6144 037144  022700  070000            CMP     #70000,R0               ;HAS ALL LO CACHE BEEN DONE?
6145 037150  001316                    BNE     7$                      ;NO,CONTINUE
6146 037152  012737  001015  177746  3$:     MOV     #OFF,CCR        ;DISABLE CACHE
```

```
 6147 037160  105037  177750                    CLRB    CMR             ;DISABLE MAINT. MODE
 6148 037164  000240                    10$:    NOP                     ;END OF TEST
      037166  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
6163                                    .SBTTL  TEST # 203 - VERIFY CACHE VALID STORE RAM MEMORY IC'S
                                        ;:*****************************************************************
                                        ;*TEST 203      VERIFY CACHE VALID STORE RAM MEMORY IC'S
                                        ;*      VERIFY CACHE VALID STORE RAM MEMORY IC'S BY PERFORMING A
                                        ;*      MARCH PATTERN TEST TO HIGH CACHE AREA OF VALID STORE(LOC. 4000-7777)
                                        ;*      PROCEDURE:  1. WRITE 0'S  TO HI CACHE VALID STORE
                                        ;*                     RAM CORRESPONDING TO LOCATIONS 4000-7777
                                        ;*                  2. READ 0 FROM  HI CACHE RAM CORRESPONDING
                                        ;*                     TO LOCATION 4000
                                        ;*                  3. WRITE  1 TO  RAM CORRESPONDING TO LOCATION
                                        ;*                     4000
                                        ;*                  4. READ 1 FROM  RAM CORRESPONDING TO LOCATION
                                        ;*                     4000
                                        ;*                  5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
                                        ;*                     AND UNTIL LOC. 7777 IS REACHED.
                                        ;:*****************************************************************
      037172                            TST203:
      037172  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      037174  037204                            .WORD   40$             ;TEST START LOCATION
      037176  060026                            .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
      037200  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      037202  060136                            .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
      037204  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
      037212  004437  002424                    JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
      037216  037522                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO LOW CACHE SPACE

6164  037220  032737  020000  177746          BIT     #VSIU,CCR       ;IS SET B USED
6165  037226  001007                          BNE     1$              ;YES
6166  037230  052737  000400  177746          BIS     #FC,CCR         ;FLUSH
6167  037236  032737  010000  177746  200$:   BIT     #VCIP,CCR
6168  037244  001374                          BNE     200$
6169  037246  012700  070000          1$:     MOV     #70000,R0       ;1ST ADDRESS LOCATION IN R0
6170  037252  012701  050000                  MOV     #50000,R1       ;ADDRESS 50000 IN R1
6171  037256  005002                          CLR     R2
6172  037260  112737  000002  177750          MOVB    #HODO,CMR       ;HODO ALLOWS CACHE UPDATES &  VALID
6173                                                                  ; STORE BITS TO BE WRITTEN TO
6174                                                                  ;CMR<12> ONLY DURING THE  DESTINATION
6175                                                                  ;ACCESS OF AN INSTRUCTION.
6176                                                                  ;STORE
6177  037266  012737  000015  177746          MOV     #15,CCR         ;NO UCB SO AS TO UPDATE VALID STORE
6178  037274  005721                  6$:     TST     (R1)+           ;
6179  037276  005720                          TST     (R0)+           ;UPDATE ALL HI CACHE VALID STORE
6180                                                                  ;ADDRESS LOCATIONS SPECIFIED BY R0
6181  037300  022700  100000                  CMP     #100000,R0      ;DONE?
6182  037304  001373                          BNE     6$              ;NO
6183  037306  012700  070000                  MOV     #70000,R0       ;ADDR. 70000 TO R0
6184  037312  052737  001000  177746          BIS     #UCB,CCR        ;ENABLE UCB
6185  037320  010220                  13$:    MOV     R2,(R0)+        ;WRITE HIT WITH UCB WILL INVALIDATE
6186                                                                  ;OR WRITE 0 TO ALL HI CACHE VALID STORE
6187  037322  022700  100000                  CMP     #100000,R0      ;DONE?
6188  037326  001374                          BNE     13$             ;NO
6189  037330  042737  001000  177746          BIC     #UCB,CCR        ;DISABLE UCB SO AS TO ALLOW VALID STORE UPDATES
6190  037336  012700  070000                  MOV     #70000,R0       ;ADDRESS 70000 TO R0
```

```
6191 037342  005710                7$:     TST     (R0)            ;READ MISS TO CACHE LOCATION SPECIFIED
6192                                                                ;BY R0.  CLOCK VALID STORE
6193                                                                ;BIT INTO CMR<12>.SHOULD BE 0.
6194                                                                ;ALSO CAUSES UPDATE TO CACHE.
6195                                                                ;VALID STORE LOCATION WILL BE WRITTEN
6196                                                                ;WITH A 1.
6197 037344  013705  177750                MOV     CMR,R5          ;SAVE CMR CONTENTS
6198 037350  005710                        TST     (R0)            ;READ HIT.CLOCK VALID STORE BIT TO CMR<12>
6199                                                                ;SHOULD BE 1.
6200 037352  013703  177750                MOV     CMR,R3          ;SAVE CMR CONTENTS
6201 037356  000240                25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     037360  000240                        NOP                     ;FOR  LOOP ON ERROR
6202 037362  042705  167777                BIC     #167777,R5      ;INTERESTED IN BIT 12
6203 037366  005705                        TST     R5              ;BIT 12 SHOULD BE 0
6204 037370  001416                        BEQ     8$              ;PASS
6205 037372  012737  001015  177746        MOV     #OFF,CCR        ;DISABLE CACHE
6206 037400  105037  177750                CLRB    CMR             ;CLEAR MAINT. MODE
6207 037404  010037  050506                MOV     R0,CA121        ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
6208 037410  006237  050506                ASR     CA121
6209 037414  104413                        ERROR                   ;ERROR
                                                                    ;-----
     037416  037414                        .WORD   .-2
6210                                                                ;VALID STORE MARCH PATTERN TEST- SET B
6211                                                                ;READING CACHE VALID STORE DATA
6212                                                                ;THRU CMR<12> DID NOT READ  0.
6213                                                                ;THIS SUGGESTS THAT A RAM LOCATION
6214                                                                ;SPECIFIED BY CA121 WAS OVERWRITTEN
6215                                                                ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
6216                                                                ;LOCATION.
6217                                                                ;THIS INDICATES THAT VALID STORE RAM
6218                                                                ;SET B IS BAD.
6219
6220 037420  050506                        CA121                   ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
6221 037422  000000                        .WORD   0
6222 037424  000430                        BR      3$              ;END THE TEST
6223 037426  042703  167777        8$:     BIC     #167777,R3      ;INTERESTED IN BIT 12 ONLY
6224 037432  022703  010000                CMP     #10000,R3       ;BIT 12 SHOULD BE 1
6225 037436  001416                        BEQ     9$              ;PASS
6226 037440  012737  001015  177746        MOV     #OFF,CCR        ;DISABLE CACHE
6227 037446  105037  177750                CLRB    CMR             ;CLEAR MAINT. MODE
6228 037452  010037  050506                MOV     R0,CA121        ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
6229 037456  006237  050506                ASR     CA121
6230 037462  104413                        ERROR                   ;ERROR
                                                                    ;-----
     037464  037462                        .WORD   .-2
6231                                                                ;VALID STORE MARCH PATTERN TEST- SET B
6232                                                                ;READING CACHE VALID STORE DATA
6233                                                                ;THRU CMR<12> DID NOT READ  1.
6234                                                                ;THIS SUGGESTS THAT VALID STORE RAM
6235                                                                ;IC SET B IS BAD.
6236                                                                ;THRU CMR<12>
6237 037466  050506                        CA121                   ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
6238 037470  000000                        .WORD   0
6239 037472  000405                        BR      3$              ;END TEST
6240 037474  062700  000002        9$:     ADD     #2,R0           ;NEXT LOCATION
6241 037500  022700  100000                CMP     #100000,R0      ;HAS ALL HI CACHE BEEN DONE?
6242 037504  001316                        BNE     7$              ;NO,CONTINUE
```

```
6243 037506  012737  001015  177746  3$:     MOV     #OFF,CCR        ;DISABLE CACHE
6244 037514  105037  177750                  CLRB    CMR             ;DISABLE MAINT. MODE
6245 037520  000240                  10$:    NOP                     ;END OF TEST
     037522  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
TEST # 204 - VERIFY CACHE VALID STORE RAM MEMORY IC'S

6266                                    .SBTTL  TEST # 204 - VERIFY CACHE VALID STORE RAM MEMORY IC'S
                                        ;;*****************************************************************
                                        ;*TEST 204      VERIFY CACHE VALID STORE RAM MEMORY IC'S
                                        ;*      VERIFY THAT THE CACHE HIT NAND GATE CAN INDICATE A READ
                                        ;*              HIT CONDITION.
                                        ;*      PROCEDURE:      CREATE A READ HIT CONDITION TO LO CACHE
                                        ;*                      WITH LO CACHE ENABLED,AND VERIFY THAT
                                        ;*                      OUTPUT OF THE CACHE HIT NAND GATE  READS 0
                                        ;*                      THRU CMR<8>.
                                        ;*      CONDITIONS:     INPUTS CACHE HIT NAND GATE:
                                        ;*                        COMPARE 1     =1
                                        ;*                        COMPARE 2     =1
                                        ;*                        COMPARE 3     =1
                                        ;*                        VALID         =1
                                        ;*                        TAG PAR. ERR  =1
                                        ;*                        HI BYTE PE    =1
                                        ;*                        LO BYTE PE    =1
                                        ;*                        MISS HI       =1
                                        ;*                        MISS LO       =1
                                        ;*                        BYPASS/WRITE  =1
                                        ;*                        FAULT         =1
                                        ;;*****************************************************************
037526                                  TST204:
037526  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
037530  037540                                  .WORD   40$             ;TEST START LOCATION
037532  070004                                  .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
037534  070030                                  .WORD   20$-40$+67764   ;SCOPE SYNC. LOCATION
037536  070040                                  .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
037540  012737  001015  177746  40$:    MOV     #OFF,CCR                ;DISABLE CACHE
037546  004437  002452                  JSR     R4,RELCTH               ;LOCATE TEST CODE TO HIGH CACHE SPACE
037552  037644                          .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

6267 037554  005037  060000            CLR     60000                   ;ALL 0'S TO MAIN MEMORY LOC. 60000
6268 037560  112737  000002  177750  1$:     MOVB    #HODO,CMR       ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AND
6269                                                                    ;CLOCKING OF OUTPUT OF CACHE HIT NAND
6270                                                                    ;GATE INTO CMR ONLY DURING THE DESTINATION
6271                                                                    ;ACCESS OF AN INSTRUCTION.
6272 037566  012737  000011  177746        MOV     #11,CCR             ;NO UCB SO AS TO WRITE CACHE STORES
6273                                                                    ;ENABLE LOW CACHE FOR A READ HIT
6274 037574  005737  040000            TST     40000                   ;
6275 037600  005737  060000            TST     60000                   ;READ UPDATE TO LOW CACHE LOACATION 0000
6276 037604  005737  060000        20$:TST     60000                   ;READ HIT; ALL INPUTS OF CACHE HIT NAND
6277                                                                    ;GATE ARE 1; CLOCK STATUS OF NAND GATE
6278                                                                    ;OUTPUT TO CMR<8>
6279 037610  013701  177750            MOV     CMR,R1                  ;SAVE CMR CONTENTS
6280 037614  000240                25$:NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
     037616  000240                    NOP                             ;FOR  LOOP ON ERROR
6281 037620  012737  001015  177746        MOV     #OFF,CCR            ;DISABLE CACHE
6282 037626  032701  000400            BIT     #HIT,R1                 ;WAS CACHE HIT SIGNAL A 0
6283 037632  001403                    BEQ     10$                     ;PASS
6284 037634  104413                    ERROR                           ;ERROR
                                                                        ;-----
     037636  037634                    .WORD   .-2
```

```
 6285                                                    ;CACHE HIT TESTS
 6286                                                    ;READING OUTPUT OF CACHE HIT NAND GATE
 6287                                                    ;THRU CMR<8> DID NOT RESULT IN A 0
 6288 037640  000000                    .WORD   0
 6289 037642  000240            10$:    NOP             ;END OF TEST
      037644  005237  001472            INC     $TESTN  ;INCREMENT TEST COUNTER
```

```
                        .SBTTL  TEST # 205 - CHECK FORCE MISS LOGIC.
                        ;*****************************************************************
                        ;*TEST 205      CHECK FORCE MISS LOGIC.
                        ;*      CHECK FORCE MISS LOGIC.
                        ;*      PROCEDURE:      CREATE A READ HIT CONDITION TO HIGH CACHE
                        ;*                      WITH 'FORCE MISS HI' DISABLED AND 'FORCE MISS
                        ;*                      LO' ENABLED. VERIFY OUTPUT OF CACHE HIT NAND
                        ;*                      GATE READS A 0 THRU CMR<8>.
                        ;*              CONDITIONS:     INPUTS CACHE HIT NAND GATE:
                        ;*                      COMPARE 1       =1
                        ;*                      COMPARE 2       =1
                        ;*                      COMPARE 3       =1
                        ;*                      VALID           =1
                        ;*                      TAG PAR. ERR    =1
                        ;*                      HI BYTE PE      =1
                        ;*                      LO BYTE PE      =1
                        ;*                      MISS HI         =1
                        ;*                      MISS LO         =1
                        ;*                      BYPASS/WRITE    =1
                        ;*                      FAULT           =1
                        ;*****************************************************************
037650                  TST205:
037650  000004                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                        ;ERROR/LOOP ON TEST
037652  037662                  .WORD   40$             ;TEST START LOCATION
037654  060004                  .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
037656  060030                  .WORD   20$-40$+57764   ;SCOPE SYNC LOCATION
037660  060040                  .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
037662  012737  001015  177746  40$:    MOV     #OFF,CCR        ;DISABLE CACHE
037670  004437  002424          JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
037674  037766                  .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                        ;ARE RELOCATED TO LOW CACHE SPACE

6310 037676  005037  070000          CLR     70000           ;ALL 0'S TO MAIN MEMORY LOC. 70000
6311 037702  112737  000002  177750  1$:     MOVB    #HODO,CMR       ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AND
6312                                                        ;CLOCKING OF OUTPUT OF CACHE HIT NAND
6313                                                        ;GATE INTO CMR ONLY DURING THE DESTINATION
6314                                                        ;ACCESS OF AN INSTRUCTION.
6315 037710  012737  000005  177746          MOV     #5,CCR          ;NO UCB SO AS TO WRITE CACHE STORES
6316                                                        ;ENABLE HI CACHE FOR A READ HIT
6317                                                        ;DISABLE LO CACHE
6318 037716  005737  050000          TST     50000           ;
6319 037722  005737  070000          TST     70000           ;READ UPDATE TO HI CACHE LOACATION 4000
6320 037726  005737  070000  20$:     TST     70000           ;READ HIT; ALL INPUTS OF CACHE HIT NAND
6321                                                        ;GATE ARE 1; CLOCK STATUS OF NAND GATE
6322                                                        ;OUTPUT TO CMR<8>
6323 037732  013701  177750          MOV     CMR,R1          ;SAVE CMR CONTENTS
6324 037736  000240  25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     037740  000240          NOP                     ;FOR  LOOP ON ERROR
6325 037742  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
6326 037750  032701  000400          BIT     #HIT,R1         ;WAS CACHE HIT SIGNAL A 0
6327 037754  001403                  BEQ     10$             ;PASS
6328 037756  104413                  ERROR                   ;ERROR
                                                        ;-----
     037760  037756                  .WORD   .-2
```

TEST # 205 - CHECK FORCE MISS LOGIC.

```
6329                                                    ;CACHE HIT TESTS
6330                                                    ;READING OUTPUT OF CACHE HIT NAND GATE
6331                                                    ;THRU CMR<8> DID NOT RESULT IN A 0
6332 037762  000000                       .WORD   0
6333 037764  000240                 10$:  NOP                     ;END OF TEST
     037766  005237  001472              INC     $TESTN           ;INCREMENT TEST COUNTER
```

TEST # 206 - CHK 'FORCE MISS LO' INHIBITS CACHE NAND GATE

```
6353                                    .SBTTL  TEST # 206 - CHK 'FORCE MISS LO' INHIBITS CACHE NAND GATE
                                        ;;*****************************************************************
                                        ;*TEST 206      CHK 'FORCE MISS LO' INHIBITS CACHE NAND GATE
                                        ;*      VERIFY THAT 'FORCE MISS LO' WILL INHIBIT CACHE HIT NAND GATE
                                        ;*      FROM INDICATING A CACHE HIT.
                                        ;*      PROCEDURE:      WITH 'FORCE MISS LO' ENABLED ATTEMPT A READ HIT TO LOW CACHE.
                                        ;*                      VERIFY THAT THE OUTPUT OF CACHE HIT NAND GATE
                                        ;*                      WILL READ AS A 1 THRU CMR<8>.
                                        ;*      CONDITIONS:     INPUTS CACHE HIT NAND GATE:
                                        ;*                        COMPARE 1     =1
                                        ;*                        COMPARE 2     =1
                                        ;*                        COMPARE 3     =1
                                        ;*                        VALID         =1
                                        ;*                        TAG PAR. ERR  =1
                                        ;*                        HI BYTE PE    =1
                                        ;*                        LO BYTE PE    =1
                                        ;*                        MISS HI       =1
                                        ;*                        MISS LO       =0
                                        ;*                        BYPASS/WRITE  =1
                                        ;*                        FAULT         =1
                                        ;;*****************************************************************
    037772                              TST206:
    037772  000004                              SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
    037774  040004                              .WORD   40$             ;TEST START LOCATION
    037776  070004                              .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
    040000  070030                              .WORD   20$-40$+67764   ;SCOPE SYNC. LOCATION
    040002  070040                              .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
    040004  012737  001015  177746  40$:  MOV     #OFF,CCR                ;DISABLE CACHE
    040012  004437  002452                       JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
    040016  040110                              .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

6354 040020  005037  060000                  CLR     60000           ;ALL 0'S TO MAIN MEMORY LOC. 60000
6355 040024  112737  000002  177750  1$:     MOVB    #HODO,CMR       ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AND
6356                                                                 ;CLOCKING OF OUTPUT OF CACHE HIT NAND
6357                                                                 ;GATE INTO CMR ONLY DURING THE DESTINATION
6358                                                                 ;ACCESS OF AN INSTRUCTION.
6359 040032  012737  000015  177746          MOV     #15,CCR         ;NO UCB SO AS TO WRITE CACHE STORES
6360                                                                 ;DISABLE LOW CACHE
6361 040040  005737  040000                  TST     40000           ;
6362 040044  005737  060000                  TST     60000           ;READ UPDATE TO LOW CACHE LOACATION 0000
6363 040050  005737  060000          20$:    TST     60000           ;READ HIT;
6364                                                                 ; CLOCK STATUS OF NAND GATE
6365                                                                 ;OUTPUT TO CMR<8>
6366 040054  013701  177750                  MOV     CMR,R1          ;SAVE CMR CONTENTS
6367 040060  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     040062  000240                          NOP                     ;FOR  LOOP ON ERROR
6368 040064  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
6369 040072  032701  000400                  BIT     #HIT,R1         ;WAS CACHE HIT SIGNAL A 1
6370 040076  001003                          BNE     10$             ;PASS
6371 040100  104413                          ERROR                   ;ERROR
                                                                     ;-----
     040102  040100                          .WORD   .-2
6372                                                                 ;CACHE HIT TESTS
```

TEST # 206 - CHK 'FORCE MISS LO' INHIBITS CACHE NAND GATE

```
6373                                                    ;READING OUTPUT OF CACHE HIT NAND GATE
6374                                                    ;THRU CMR<8> DID NOT RESULT IN A 1
6375 040104  000000                    .WORD   0
6376 040106  000240            10$:    NOP             ;END OF TEST
     040110  005237  001472            INC     $TESTN  ;INCREMENT TEST COUNTER
```

```
6393                                    .SBTTL  TEST # 207 - CHK 'TAG PARITY ERROR' INHIBITS CACHE NAND GATE
                                        ;;*****************************************************************
                                        ;*TEST 207      CHK 'TAG PARITY ERROR' INHIBITS CACHE NAND GATE
                                        ;*      VERIFY THAT 'TAG PARITY ERROR' WILL INHIBIT CACHE HIT NAND GATE
                                        ;*      FROM INDICATING A CACHE HIT.
                                        ;*      CONDITIONS:     INPUTS CACHE HIT NAND GATE:
                                        ;*                        COMPARE 1     =1
                                        ;*                        COMPARE 2     =1
                                        ;*                        COMPARE 3     =1
                                        ;*                        VALID         =1
                                        ;*                        TAG PAR. ERR  =0
                                        ;*                        HI BYTE PE    =1
                                        ;*                        LO BYTE PE    =1
                                        ;*                        MISS HI       =1
                                        ;*                        MISS LO       =1
                                        ;*                        BYPASS/WRITE  =1
                                        ;*                        FAULT         =1
                                        ;;*****************************************************************
     040114                             TST207:
     040114  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     040116  040126                             .WORD   40$             ;TEST START LOCATION
     040120  070000                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     040122  070054                             .WORD   20$-40$+67764   ;SCOPE SYNC. LOCATION
     040124  070072                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     040126  012737  001015  177746     40$:    MOV     #OFF,CCR        ;DISABLE CACHE
     040134  004437  002452                    JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     040140  040274                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

6394 040142  005037  000000             1$:     CLR     0               ;0'S TO MAIN MEMORY LOCATION 0.
6395 040146  112737  000002  177750             MOVB    #HODO,CMR       ;HODO ALLOWS UPDATES AND CACHE HITS
6396                                                                    ; ONLY DURING THE DESTINATION ACCESS OF
6397                                                                    ;AN INSTRUCTION.
6398 040154  012737  000015  177746             MOV     #15,CCR         ;NO UCB SO AS TO WRITE CACHE STORES
6399 040162  005737  000000                     TST     0               ;
6400 040166  005737  040000                     TST     40000           ;UPDATE CACHE LOCATION 0000 WITH CORRECT PARITY STORAGE
6401 040172  052737  002000  177746             BIS     #WWPT,CCR       ;ALLOW WRITE WRONG PARITY TO TAGG PARITY STORE
6402 040200  005737  000000                     TST     0               ;READ UPDATE TO CACHE LOCATION 0000;
6403                                                                    ;ALL 0'S(EVEN DATA) WILL BE WRITTEN TO DATA/TAG STORES,
6404                                                                    ;0'S INTO DATA PARITY STORES,AND A 1
6405                                                                    ;INTO TAG PARITY STORE.
6406 040204  042737  002004  177746             BIC     #WWPT+FMLO,CCR  ;DISABLE WWPT;ENABLE LOW CACHE
6407 040212  005037  177744                     CLR     CME             ;CLEAR CME
6408 040216  005737  000000             20$:    TST     0               ;READ HIT; ALL 0'S WILL BE PLACED ON INPUTS
6409                                                                    ;OF DATA PARITY ERROR CHECK PARITY GEN'S, BUT
6410                                                                    ;TAG PARITY CHECK GENERATOR WILL
6411                                                                    ;SEE ODD DATA DUE TO WRONG PARITY
6412                                                                    ;FROM PREVIOUS READ UPDATE.
6413                                                                    ;OUTPUT TO CMR<8>
6414 040222  013701  177750                     MOV     CMR,R1          ;SAVE CMR CONTENTS
6415 040226  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
6416 040234  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     040236  000240                             NOP                     ;FOR  LOOP ON ERROR
6417 040240  052737  000400  177746             BIS     #FC,CCR         ;BEFORE LEAVING TEST ELIMINATE EFFECT OF WWPT
```

TEST # 207 - CHK 'TAG PARITY ERROR' INHIBITS CACHE NAND GATE

```
 6418 040246  032737  010000  177746  500$:   BIT     #VCIP,CCR       ;WAIT TILL DONE
 6419 040254  001374                          BNE     500$
 6420 040256  032701  000400                  BIT     #HIT,R1         ;WAS CACHE HIT SIGNAL A 1
 6421 040262  001003                          BNE     10$             ;PASS
 6422 040264  104413                          ERROR                   ;ERROR
                                              ;-----
      040266  040264                          .WORD   .-2
 6423                                         ;CACHE HIT TESTS
 6424                                         ;READING OUTPUT OF CACHE HIT NAND GATE
 6425                                         ;THRU CMR<8> DID NOT RESULT IN A 1
 6426 040270  000000                          .WORD   0
 6427 040272  000240                  10$:    NOP                     ;END OF TEST
      040274  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 210 - CHK 'LO & HI BYTE PARITY ERROR' STOPS NAND GATE
                                ;;*****************************************************************
                                ;*TEST 210      CHK 'LO & HI BYTE PARITY ERROR' STOPS NAND GATE
                                ;*      VERIFY THAT 'LO & HI BYTE PARITY ERROR' WILL INHIBIT CACHE HIT NAND GATE
                                ;*      FROM INDICATING A CACHE HIT.
                                ;*      CONDITIONS:     INPUTS CACHE HIT NAND GATE:
                                ;*                        COMPARE 1     =1
                                ;*                        COMPARE 2     =1
                                ;*                        COMPARE 3     =1
                                ;*                        VALID         =1
                                ;*                        TAG PAR. ERR  =1
                                ;*                        HI BYTE PE    =0
                                ;*                        LO BYTE PE    =0
                                ;*                        MISS HI       =1
                                ;*                        MISS LO       =1
                                ;*                        BYPASS/WRITE  =1
                                ;*                        FAULT         =1
                                ;;*****************************************************************
040300                          TST210:
040300  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
040302  040312                        .WORD   40$             ;TEST START LOCATION
040304  070000                        .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
040306  070054                        .WORD   20$-40$+67764   ;SCOPE SYNC. LOCATION
040310  070072                        .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
040312  012737  001015  177746  40$:  MOV     #OFF,CCR        ;DISABLE CACHE
040320  004437  002452                JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
040324  040460                        .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE
6445 040326  005037  000000    1$:  CLR     0               ;0'S TO MAIN MEMORY LOCATION 0.
6446 040332  112737  000002  177750  MOVB    #HODO,CMR       ;HODO ALLOWS UPDATES AND CACHE HITS
6447                                                        ; ONLY DURING THE DESTINATION ACCESS OF
6448                                                        ;AN INSTRUCTION.
6449 040340  012737  000015  177746  MOV     #15,CCR         ;NO UCB SO AS TO WRITE CACHE STORES
6450 040346  005737  000000          TST     0               ;
6451 040352  005737  040000          TST     40000           ;UPDATE CACHE LOCATION 0000 WITH CORRECT PARITY STORAGE
6452 040356  052737  000100  177746  BIS     #WWPD,CCR       ;ALLOW WRITE WRONG PARITY DATA TO LO
6453                                                        ;& HI BYTE PARITY STORE.
6454 040364  005737  000000          TST     0               ;READ UPDATE TO CACHE LOCATION 0000;
6455                                                        ;ALL 0'S WILL BE WRITTEN TO DATA/TAG STORES,
6456                                                        ;1'S INTO LO & HI BYTE DATA PARITY STORES,AND A 0
6457                                                        ;INTO TAG PARITY STORE.
6458 040370  042737  000104  177746  BIC     #WWPD+FMLO,CCR  ;DISABLE WWPD;ENABLE LO CACHE
6459 040376  005037  177744          CLR     CME             ;CLEAR CME
6460 040402  005737  000000    20$:  TST     0               ;READ HIT; ALL 0'S(EVEN DATA) WILL BE
6461                                                        ;PLACED ON INPUTS
6462                                                        ;OF TAG PARITY ERROR CHECK PARITY GEN'S, BUT
6463                                                        ;LO & HI BYTE PARITY CHECK GENERATORS WILL
6464                                                        ;SEE ODD DATA DUE TO WRONG PARITY
6465                                                        ;FROM PREVIOUS READ UPDATE.
6466                                                        ; CLOCK STATUS OF NAND GATE TO
6467                                                        ;OUTPUT TO CMR<8>
6468 040406  013701  177750          MOV     CMR,R1          ;SAVE CMR CONTENTS
6469 040412  012737  001015  177746  MOV     #OFF,CCR        ;DISABLE CACHE
```

```
6470 040420  000240                  25$:   NOP                    ;INSTRUCTION 'JMP 1$' PLACED HERE
     040422  000240                         NOP                    ;FOR  LOOP ON ERROR
6471 040424  052737  000400  177746         BIS    #FC,CCR         ;BEFORE LEAVING TEST ELIMINATE EFFECTS OF WWPD
6472 040432  032737  010000  177746  500$:  BIT    #VCIP,CCR       ;WAIT TILL DONE
6473 040440  001374                         BNE    500$
6474 040442  032701  000400                BIT    #HIT,R1         ;WAS CACHE HIT SIGNAL A 1
6475 040446  001003                         BNE    10$             ;PASS
6476 040450  104413                         ERROR                  ;ERROR
                                                                    ;-----
     040452  040450                         .WORD  .-2
6477                                                                ;CACHE HIT TESTS
6478                                                                ;READING OUTPUT OF CACHE HIT NAND GATE
6479                                                                ;THRU CMR<8> DID NOT RESULT IN A 1
6480 040454  000000                         .WORD  0
6481 040456  000240                  10$:   NOP                    ;END OF TEST
     040460  005237  001472                INC    $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 211 - 'FORCE MISS HI' INHIBITS NAND FROM IND. CACHE HIT
                                ;;*****************************************************************
                                ;*TEST 211       'FORCE MISS HI' INHIBITS NAND FROM IND. CACHE HIT
                                ;*      VERIFY THAT 'FORCE MISS HI' WILL INHIBIT CACHE HIT NAND GATE
                                ;*      FROM INDICATING A CACHE HIT.
                                ;*      PROCEDURE:      WITH 'FORCE MISS HI' ENABLED ATTEMPT A READ HIT TO HI CACHE.
                                ;*                      VERIFY THAT THE OUTPUT OF CACHE HIT NAND GATE
                                ;*                      WILL READ AS A 1 THRU CMR<8>.
                                ;*      CONDITIONS:     INPUTS CACHE HIT NAND GATE:
                                ;*                        COMPARE 1     =1
                                ;*                        COMPARE 2     =1
                                ;*                        COMPARE 3     =1
                                ;*                        VALID         =1
                                ;*                        TAG PAR. ERR  =1
                                ;*                        HI BYTE PE    =1
                                ;*                        LO BYTE PE    =1
                                ;*                        MISS HI       =0
                                ;*                        MISS LO       =1
                                ;*                        BYPASS/WRITE  =1
                                ;*                        FAULT         =1
                                ;;*****************************************************************
 040464                         TST211:
 040464  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
 040466  040476                        .WORD   40$             ;TEST START LOCATION
 040470  060004                        .WORD   1$-40$+57764    ;LOOP ON ERROR START LOCATION
 040472  060030                        .WORD   20$-40$+57764   ;SCOPE SYNC LOCATION
 040474  060040                        .WORD   25$-40$+57764   ;LOOP ON ERROR END LOCATION
 040476  012737  001015  177746  40$:  MOV     #OFF,CCR        ;DISABLE CACHE
 040504  004437  002424                JSR     R4,RELCTL       ;LOCATE TEST CODE TO LOW CACHE SPACE
 040510  040602                        .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO LOW CACHE SPACE

6502 040512  005037  070000            CLR     70000           ;ALL 0'S TO MAIN MEMORY LOC. 70000
6503 040516  112737  000002  177750 1$:  MOVB    #HODO,CMR       ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AND
6504                                                            ;CLOCKING OF OUTPUT OF CACHE HIT NAND
6505                                                            ;GATE INTO CMR ONLY DURING THE DESTINATION
6506                                                            ;ACCESS OF AN INSTRUCTION.
6507 040524  012737  000015  177746        MOV     #15,CCR         ;NO UCB SO AS TO WRITE CACHE STORES
6508                                                            ;DISABLE HI CACHE
6509 040532  005737  050000            TST     50000           ;
6510 040536  005737  070000            TST     70000           ;READ UPDATE HI CACHE LOCATION 4000
6511 040542  005737  070000       20$: TST     70000           ;READ HIT; CLOCK STATUS OF NAND GATE
6512                                                            ;OUTPUT TO CMR<8>
6513 040546  013701  177750            MOV     CMR,R1          ;SAVE CMR CONTENTS
6514 040552  000240                25$: NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     040554  000240                     NOP                     ;FOR  LOOP ON ERROR
6515 040556  012737  001015  177746        MOV     #OFF,CCR        ;DISABLE CACHE
6516 040564  032701  000400            BIT     #HIT,R1         ;WAS CACHE HIT SIGNAL A 1
6517 040570  001003                    BNE     10$             ;PASS
6518 040572  104413                    ERROR                   ;ERROR
                                                                ;-----
     040574  040572                    .WORD   .-2
6519                                                            ;CACHE HIT TESTS
6520                                                            ;READING OUTPUT OF CACHE HIT NAND GATE
```

TEST # 211 - 'FORCE MISS HI' INHIBITS NAND FROM IND. CACHE HIT

```
 6521                                                          ;THRU CMR<8> DID NOT RESULT IN A 1
 6522 040576  000000                        .WORD   0
 6523 040600  000240                10$:    NOP                ;END OF TEST
      040602  005237  001472                INC     $TESTN     ;INCREMENT TEST COUNTER
```

```
6543                                    .SBTTL  TEST # 212 - 'UNCONDITIONAL CACHE BYPASS' NO HIT CHECK
                                        ;;*****************************************************************
                                        ;*TEST 212      'UNCONDITIONAL CACHE BYPASS' NO HIT CHECK
                                        ;*      VERIFY THAT AN 'UNCONDITIONAL CACHE BYPASS' WILL INHIBIT CACHE HIT NAND GATE
                                        ;*      FROM INDICATING A CACHE HIT.
                                        ;*      PROCEDURE:      CAUSE A READ HIT TO LO CACHE WITH UCB ENABLED
                                        ;*                      VERIFY THAT THE OUTPUT OF CACHE HIT NAND GATE
                                        ;*                      WILL READ AS A 1 THRU CMR<8>.
                                        ;*              CONDITIONS:     INPUTS CACHE HIT NAND GATE:
                                        ;*                              COMPARE 1       =1
                                        ;*                              COMPARE 2       =1
                                        ;*                              COMPARE 3       =1
                                        ;*                              VALID           =1
                                        ;*                              TAG PAR. ERR    =1
                                        ;*                              HI BYTE PE      =1
                                        ;*                              LO BYTE PE      =1
                                        ;*                              MISS HI         =1
                                        ;*                              MISS LO         =1
                                        ;*                              BYPASS/WRITE    =0
                                        ;*                              FAULT           =1
                                        ;;*****************************************************************
     040606                             TST212:
     040606  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     040610  040620                             .WORD   40$             ;TEST START LOCATION
     040612  070004                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     040614  070036                             .WORD   20$-40$+67764   ;SCOPE SYNC. LOCATION
     040616  070054                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     040620  012737  001015  177746     40$:    MOV     #OFF,CCR        ;DISABLE CACHE
     040626  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     040632  040732                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

6544 040634  005037  060000             1$:     CLR     60000           ;ALL 0'S TO MAIN MEMORY LOCATION 60000
6545 040640  112737  000002  177750             MOVB    #HODO,CMR       ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AND
6546                                                                     ;CLOCKING OF OUTPUT OF CACHE HIT NAND
6547                                                                     ;GATE INTO CMR ONLY DURING THE DESTINATION
6548                                                                     ;ACCESS OF AN INSTRUCTION.
6549 040646  012737  000011  177746             MOV     #11,CCR         ;NO UCB SO AS TO UPDATE CACHE STORES
6550                                                                     ;ENABLE LOW CACHE
6551 040654  005737  040000                     TST     40000           ;
6552 040660  005737  060000                     TST     60000           ;READ UPDATE TO LOW CACHE LOCATION 0000
6553 040664  052737  001000  177746             BIS     #UCB,CCR        ;ENABLE UCB
6554 040672  005737  060000             20$:    TST     60000           ;READ HIT; CLOCK STATUS OF NAND GATE
6555                                                                     ;OUTPUT TO CMR<8>
6556 040676  013701  177750                     MOV     CMR,R1          ;SAVE CMR CONTENTS
6557 040702  012737  001015  177746             MOV     #OFF,CCR        ;DISABLE CACHE
6558 040710  000240             25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
     040712  000240                     NOP                             ;FOR  LOOP ON ERROR
6559 040714  032701  000400                     BIT     #HIT,R1         ;WAS CACHE HIT SIGNAL A 1
6560 040720  001003                             BNE     10$             ;PASS
6561 040722  104413                             ERROR                   ;ERROR
                                                                         ;-----
     040724  040722                             .WORD   .-2
6562                                                                     ;CACHE HIT TESTS
```

```
                                                                ;READING OUTPUT OF CACHE HIT NAND GATE
                                                                ;THRU CMR<8> DID NOT RESULT IN A 1
040726  000000                          .WORD   0
040730  000240                  10$:    NOP                     ;END OF TEST
040732  005237  001472                  INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
6591                                    .SBTTL  TEST # 213 - 'VALID' INPUT TO NAND INHIBITS IND. CACHE HIT
                                        ;;*****************************************************************
                                        ;*TEST 213      'VALID' INPUT TO NAND INHIBITS IND. CACHE HIT
                                        ;*      VERIFY THAT 'VALID' INPUT TO CACHE HIT NAND GATE WILL INHIBIT NAND
                                        ;*      GATE FROM INDICATING A CACHE HIT.
                                        ;*      PROCEDURE:      CREATE A CONDITION WHERE ONLY VALID INPUT ON
                                        ;*                      CACHE HIT NAND GATE INHIBITS  NAND GATE:
                                        ;*                              1.UPDATE CACHE LOCATION 0000
                                        ;*                              2.CAUSE INVALIDATION BY A WRITE HIT
                                        ;*                                IN BYPASS MODE
                                        ;*                              3.CAUSE READ HIT
                                        ;*                      VERIFY THAT OUTPUT OF NAND GATE
                                        ;*                      WILL READ AS A 1 THRU CMR<8>.
                                        ;*      CONDITIONS:     INPUTS CACHE HIT NAND GATE:
                                        ;*                        COMPARE 1     =1
                                        ;*                        COMPARE 2     =1
                                        ;*                        COMPARE 3     =1
                                        ;*                        VALID         =0
                                        ;*                        TAG PAR. ERR  =1
                                        ;*                        HI BYTE PE    =1
                                        ;*                        LO BYTE PE    =1
                                        ;*                        MISS HI       =1
                                        ;*                        MISS LO       =1
                                        ;*                        BYPASS/WRITE  =1
                                        ;*                        FAULT         =1
                                        ;;*****************************************************************
                                        TST213:
        040736
        040736  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
        040740  040750                  .WORD   40$                     ;TEST START LOCATION
        040742  070012                  .WORD   1$-40$+67764            ;LOOP ON ERROR START LOCATION
        040744  070054                  .WORD   20$-40$+67764           ;SCOPE SYNC. LOCATION
        040746  070064                  .WORD   25$-40$+67764           ;LOOP ON ERROR END LOCATION
        040750  012737  001015  177746  40$:    MOV     #OFF,CCR        ;DISABLE CACHE
        040756  004437  002452          JSR     R4,RELCTH               ;LOCATE TEST CODE TO HIGH CACHE SPACE
        040762  041100                  .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

6592    040764  005000                  CLR     R0                      ;CLEAR R0
6593    040766  005037  060000          CLR     60000                   ;ALL 0'S TO MAIN MEMORY LOC. 60000
6594    040772  012701  060000          MOV     #60000,R1               ;ADDRESS 60000 TO R1
6595    040776  112737  000002  177750  1$:     MOVB    #HODO,CMR       ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AND
6596                                                                    ;CLOCKING OF OUTPUT OF CACHE HIT NAND
6597                                                                    ;GATE INTO CMR ONLY DURING THE DESTINATION
6598                                                                    ;ACCESS OF AN INSTRUCTION.
6599    041004  012737  000011  177746          MOV     #11,CCR         ;NO UCB SO AS TO WRITE CACHE STORES
6600                                                                    ;ENABLE LO CACHE
6601    041012  005737  040000          TST     40000                   ;
6602    041016  005737  060000          TST     60000                   ;READ UPDATE; ASSURE CORRECT PARITY IS WRITTEN
6603                                                                    ;FOR CACHE LOCATION 0000
6604    041022  052737  001000  177746          BIS     #UCB,CCR        ;SET UCB SO AS TO INVALIDATE CACHE LOCATIONS
6605                                                                    ;DURING WRITE HIT
6606    041030  010011                  MOV     R0,(R1)                 ;CAUSE WRITE HIT TO LOCATION 60000;
6607                                                                    ;UCB CAUSES CACHE LOC. 0000 TO BE INVALIDATED
6608    041032  042737  001000  177746          BIC     #UCB,CCR        ;CLEAR UCB
```

TEST # 213 - 'VALID' INPUT TO NAND INHIBITS IND. CACHE HIT

```
6609 041040  005737  060000          20$:   TST     60000          ;READ UPDATE CAUSED BY VALID STORE
6610                                                               ;INVALIDATED; ALL INPUTS TO CACHE HIT NAND GATE
6611                                                               ;ARE 1 EXCEPT VALID.CLOCK STATUS OF NAND GATE
6612                                                               ;OUTPUT TO CMR<8>
6613 041044  013702  177750                MOV     CMR,R2         ;SAVE CMR CONTENTS
6614 041050  000240                 25$:   NOP                    ;INSTRUCTION 'JMP 1$' PLACED HERE
     041052  000240                        NOP                    ;FOR  LOOP ON ERROR
6615 041054  012737  001015  177746        MOV     #OFF,CCR       ;DISABLE CACHE
6616 041062  032702  000400                BIT     #HIT,R2        ;WAS CACHE HIT SIGNAL A 1
6617 041066  001003                       BNE     10$            ;PASS
6618 041070  104413                       ERROR                  ;ERROR
                                                                   ;-----
     041072  041070                        .WORD   .-2
6619                                                               ;CACHE HIT TESTS
6620                                                               ;READING OUTPUT OF CACHE HIT NAND GATE
6621                                                               ;THRU CMR<8> DID NOT RESULT IN A 1
6622 041074  000000                 10$:   .WORD   0
6623 041076  000240                        NOP                    ;END OF TEST
     041100  005237  001472                INC     $TESTN         ;INCREMENT TEST COUNTER
```

```
6644                                    .SBTTL  TEST # 214 - 'COMPARE 1'' INPUT STOPS GATE FROM IND. HIT
                                        ;;*****************************************************************
                                        ;*TEST 214      'COMPARE 1'' INPUT STOPS GATE FROM IND. HIT
                                        ;*      VERIFY THAT 'COMPARE 1'' INPUT TO CACHE HIT NAND GATE CAN INHIBIT
                                        ;*      NAND GATE FROM INDICATING A CACHE HIT.
                                        ;*      PROCEDURE:      CREATE A READ UPDATE TO LOW CACHE  CAUSED BY ONLY
                                        ;*                      BIT 18 ON CACHE ADDRESS LINE BEING DIFFERENT
                                        ;*                      FROM BIT 18 IN TAG STORE. VERIFY THAT OUTPUT  OF CACHE HIT
                                        ;*                      NAND GATE WILL READ AS A 1 THRU CMR<8>.
                                        ;*      CONDITIONS:     INPUTS CACHE HIT NAND GATE:
                                        ;*                        COMPARE 1     =0
                                        ;*                        COMPARE 2     =1
                                        ;*                        COMPARE 3     =1
                                        ;*                        VALID         =1
                                        ;*                        TAG PAR. ERR  =1
                                        ;*                        HI BYTE PE    =1
                                        ;*                        LO BYTE PE    =1
                                        ;*                        MISS HI       =1
                                        ;*                        MISS LO       =1
                                        ;*                        BYPASS/WRITE  =1
                                        ;*                        FAULT         =1
                                        ;;*****************************************************************
                                        TST214:
041104
041104  000004                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
041106  041116                                .WORD   40$             ;TEST START LOCATION
041110  070000                                .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
041112  070066                                .WORD   20$-40$+67764   ;SCOPE SYNC. LOCATION
041114  070106                                .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
041116  012737  001015  177746  40$:    MOV     #OFF,CCR                ;DISABLE CACHE
041124  004437  002452                  JSR     R4,RELCTH               ;LOCATE TEST CODE TO HIGH CACHE SPACE
041130  041312                         .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

6645 041132  012737  070100  000004  1$:     MOV     #3$-1$+70000,4  ;SETUP FOR POTENTIAL TRAP
6646 041140  012737  000340  000006          MOV     #340,6
6647 041146  012737  010000  172350          MOV     #10000,KPAR4    ;MAP PAGE 4 FOR 128K-132K ADDRESSING
6648 041154  012700  100000                  MOV     #100000,R0      ;LOAD VIRTUAL ADDRESS IN R0.WHEN MEMORY
6649                                                                 ;MANAGEMENT IS ENABLED,PAGE 4 WILL
6650                                                                 ;BE SELECTED AND ADDRESS 10000000
6651                                                                 ;WILL BE ACCESSED.
6652 041160  012737  000001  177572          MOV     #1,SR0          ;ENABLE MEM. MNGMENT.
6653 041166  012737  000020  172516          MOV     #20,SR3         ;ENABLE 22-BIT MAPPING
6654 041174  112737  000002  177750          MOVB    #HODO,CMR       ;HODO ALLOWS READ HITS,UPDATES, AND
6655                                                                 ;CLOCKING OF OUTPUT OF CACHE HIT NAND
6656                                                                 ;GATE INTO CMR ONLY DURING THE DESTINATION
6657                                                                 ;ACCESS OF AN INSTRUCTION.
6658 041202  012737  000011  177746          MOV     #11,CCR         ;NO UCB SO AS TO WRITE CACHE STORES
6659                                                                 ;ENABLE LOW CACHE
6660 041210  005737  040000                  TST     40000           ;
6661 041214  005737  000000                  TST     0               ;READ UPDATE; ASSURE ALL 0'S IN TAG STORE
6662                                                                 ;LOCATION 0000,AND CORRECT PARITY IS WRITTEN.
6663 041220  005710                  20$:    TST     (R0)            ;READ UPDATE TO CACHE LOCATION 0000
6664                                                                 ;CAUSED BY BIT 18 ON CACHE ADDRESS LINE
6665                                                                 ;DIFFERENT FROM TAG STORE BIT 18.
```

```
                                                                        ; CLOCK STATUS OF NAND GATE
                                                                        ;OUTPUT TO CMR<8>
6668 041222  000240                          NOP
6669 041224  013701  177750                 MOV     CMR,R1             ;SAVE CMR CONTENTS
6670 041230  000403                          BR      25$
6671 041232  013701  177750          3$:     MOV     CMR,R1             ;IF TRAP OCCURS WILL RETURN HERE
6672 041236  022626                          CMP     (SP)+,(SP)+        ;ADJUST STACK AND VECTORS
6673 041240  000240                  25$:    NOP                        ;INSTRUCTION 'JMP 1$' PLACED HERE
     041242  000240                          NOP                        ;FOR  LOOP ON ERROR
6674 041244  005037  177572                 CLR     SR0                ;DISABLE MEM. MNGMENT.
6675 041250  005037  172516                 CLR     SR3                ;DISABLE 22 BIT MAPPING
6676 041254  012737  001015  177746         MOV     #OFF,CCR           ;DISABLE CACHE
6677 041262  012737  000006  000004         MOV     #6,4               ;RESTORE VECTORS
6678 041270  005037  000006                 CLR     6
6679 041274  032701  000400                 BIT     #HIT,R1            ;WAS CACHE HIT SIGNAL A 1
6680 041300  001003                         BNE     10$                ;PASS
6681 041302  104413                         ERROR                      ;ERROR
                                                                        ;-----
     041304  041302                         .WORD   .-2
6682
6683                                                                    ;CACHE HIT TESTS
                                                                        ;READING OUTPUT OF CACHE HIT NAND GATE
6684                                                                    ;THRU CMR<8> DID NOT RESULT IN A 1
6685 041306  000000                         .WORD   0
6686 041310  000240                  10$:    NOP                        ;END OF TEST
     041312  005237  001472                 INC     $TESTN             ;INCREMENT TEST COUNTER
```

```
6707                                    .SBTTL  TEST # 215 - 'COMPARE 2' INPUT STOPS NAND FROM IND. HIT
                                        ;;*****************************************************************
                                        ;*TEST 215       'COMPARE 2' INPUT STOPS NAND FROM IND. HIT
                                        ;*      VERIFY THAT 'COMPARE 2' INPUT TO CACHE HIT NAND GATE CAN INHIBIT
                                        ;*      NAND GATE FROM INDICATING A CACHE HIT.
                                        ;*      PROCEDURE:      CREATE A READ UPDATE TO LOW CACHE  CAUSED BY ONLY
                                        ;*                      BIT 14 ON CACHE ADDRESS LINE BEING DIFFERENT
                                        ;*                      FROM BIT 14 IN TAG STORE. VERIFY THAT OUTPUT  OF CACHE HIT
                                        ;*                      NAND GATE WILL READ AS A 1 THRU CMR<8>.
                                        ;*      CONDITIONS:     INPUTS CACHE HIT NAND GATE:
                                        ;*                        COMPARE 1     =1
                                        ;*                        COMPARE 2     =0
                                        ;*                        COMPARE 3     =1
                                        ;*                        VALID         =1
                                        ;*                        TAG PAR. ERR  =1
                                        ;*                        HI BYTE PE    =1
                                        ;*                        LO BYTE PE    =1
                                        ;*                        MISS HI       =1
                                        ;*                        MISS LO       =1
                                        ;*                        BYPASS/WRITE  =1
                                        ;*                        FAULT         =1
                                        ;;*****************************************************************
041316                                  TST215:
041316  000004                                  SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                ;ERROR/LOOP ON TEST
041320  041330                                  .WORD   40$                     ;TEST START LOCATION
041322  070000                                  .WORD   1$-40$+67764            ;LOOP ON ERROR START LOCATION
041324  070024                                  .WORD   20$-40$+67764           ;SCOPE SYNC. LOCATION
041326  070034                                  .WORD   25$-40$+67764           ;LOOP ON ERROR END LOCATION
041330  012737  001015  177746  40$:    MOV     #OFF,CCR                        ;DISABLE CACHE
041336  004437  002452                  JSR     R4,RELCTH                       ;LOCATE TEST CODE TO HIGH CACHE SPACE
041342  041430                          .WORD   10$+2                           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

6708 041344  112737  000002  177750  1$:     MOVB    #HODO,CMR               ;HODO ALLOWS READ HITS,UPDATES, AND
6709                                                                            ;CLOCKING OF OUTPUT OF CACHE HIT NAND
6710                                                                            ;GATE INTO CMR ONLY DURING THE DESTINATION
6711                                                                            ;ACCESS OF AN INSTRUCTION.
6712 041352  012737  000011  177746          MOV     #11,CCR                 ;NO UCB SO AS TO WRITE CACHE STORES
6713                                                                            ;ENABLE LOW CACHE
6714 041360  005737  040000                  TST     40000                   ;
6715 041364  005737  000000                  TST     0                       ;READ UPDATE; ASSURE ALL 0'S IN TAG STORE
6716                                                                            ;LOCATION 0000,AND CORRECT PARITY IS WRITTEN.
6717 041370  005737  040000          20$:    TST     40000                   ;READ UPDATE TO CACHE LOCATION 0000
6718                                                                            ;CAUSED BY BIT 14 ON CACHE ADDRESS LINE
6719                                                                            ;DIFFERENT FROM TAG STORE BIT 14.
6720                                                                            ; CLOCK STATUS OF NAND GATE
6721                                                                            ;OUTPUT TO CMR<8>
6722 041374  013701  177750                  MOV     CMR,R1                  ;SAVE CMR CONTENTS
6723 041400  000240                  25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
     041402  000240                          NOP                             ;FOR  LOOP ON ERROR
6724 041404  012737  001015  177746          MOV     #OFF,CCR                ;DISABLE CACHE
6725 041412  032701  000400                  BIT     #HIT,R1                 ;WAS CACHE HIT SIGNAL A 1
6726 041416  001003                          BNE     10$                     ;PASS
6727 041420  104413                          ERROR                           ;ERROR
```

```
                                                                    ;-----
     041422  041420                          .WORD   .-2
6728                                                                ;CACHE HIT TESTS
6729                                                                ;READING OUTPUT OF CACHE HIT NAND GATE
6730                                                                ;THRU CMR<8> DID NOT RESULT IN A 1
6731 041424  000000                          .WORD   0
6732 041426  000240                  10$:    NOP                    ;END OF TEST
     041430  005237  001472                  INC     $TESTN         ;INCREMENT TEST COUNTER
```

```
6754                                    .SBTTL  TEST # 216 - 'COMPARE 3' INPUT STOPS GATE FROM IND. HIT
                                        ;;*****************************************************************
                                        ;*TEST 216      'COMPARE 3' INPUT STOPS GATE FROM IND. HIT
                                        ;*      VERIFY THAT 'COMPARE 3' INPUT TO CACHE NAND GATE WILL INHIBIT NAND GATE
                                        ;*      FROM INDICATING A CACH HIT.
                                        ;*      PROCEDURE:      CREATE A READ UPDATE TO LO CACHE CAUSED BY
                                        ;*                      ONLY  BIT 13 ON CACHE ADDRESS LINE BEING
                                        ;*                      DIFFERENT FROM BIT 13 IN TAG STORE.
                                        ;*                      VERIFY THAT THE OUTPUT OF CACHE HIT NAND GATE
                                        ;*                      WILL READ AS A 1 THRU CMR<8>.
                                        ;*      CONDITIONS:     INPUTS CACHE HIT NAND GATE:
                                        ;*                        COMPARE 1     =1
                                        ;*                        COMPARE 2     =1
                                        ;*                        COMPARE 3     =0
                                        ;*                        VALID         =1
                                        ;*                        TAG PAR. ERR  =1
                                        ;*                        HI BYTE PE    =1
                                        ;*                        LO BYTE PE    =1
                                        ;*                        MISS HI       =1
                                        ;*                        MISS LO       =1
                                        ;*                        BYPASS/WRITE  =1
                                        ;*                        FAULT         =1
                                        ;;*****************************************************************
041434                                  TST216:
041434  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
041436  041446                                  .WORD   40$             ;TEST START LOCATION
041440  070000                                  .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
041442  070024                                  .WORD   20$-40$+67764   ;SCOPE SYNC. LOCATION
041444  070034                                  .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
041446  012737  001015  177746  40$:    MOV     #OFF,CCR                ;DISABLE CACHE
041454  004437  002452                  JSR     R4,RELCTH               ;LOCATE TEST CODE TO HIGH CACHE SPACE
041460  041546                          .WORD   10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

6755 041462  112737  000002  177750  1$:     MOVB    #HODO,CMR               ;HODO ALLOWS READ HITS,UPDATES, AND
6756                                                                         ;CLOCKING OF OUTPUT OF CACHE HIT NAND
6757                                                                         ;GATE INTO CMR ONLY DURING THE DESTINATION
6758                                                                         ;ACCESS OF AN INSTRUCTION.
6759 041470  012737  000011  177746          MOV     #11,CCR                 ;NO UCB SO AS TO UPDATE CACHE STORES
6760                                                                         ;ENABLE LOW CACHE
6761 041476  005737  020000                  TST     20000                   ;
6762 041502  005737  000000                  TST     0                       ;READ UPDATE; ASSURE ALL 0'S IN TAG
6763                                                                         ;STORE LOCATION 0000 AND CORRECT PARITY
6764                                                                         ;IS WRITTEN.
6765 041506  005737  020000          20$:    TST     20000                   ;READ UPDATE TO CACHE LOC. 0000 CAUSED BY
6766                                                                         ;BIT 13 ON CACHE ADDRESS LINES BEING
6767                                                                         ;DIFFERENT FROM BIT 13 IN TAG STORE.
6768                                                                         ;CLOCK STATUS OF CACHE HIT NAND GATE
6769                                                                         ;OUTPUT TO CMR<8>
6770 041512  013701  177750                  MOV     CMR,R1                  ;SAVE CMR CONTENTS
6771 041516  000240                  25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
     041520  000240                          NOP                             ;FOR  LOOP ON ERROR
6772 041522  012737  001015  177746          MOV     #OFF,CCR                ;DISABLE CACHE
6773 041530  032701  000400                  BIT     #HIT,R1                 ;WAS CACHE HIT SIGNAL A 1
```

```
                                                                H 4
 6774 041534  001003                        BNE     10$             ;PASS
 6775 041536  104413                        ERROR                   ;ERROR
                                                                    ;-----
      041540  041536                        .WORD   .-2
 6776                                                               ;CACHE HIT TESTS
 6777                                                               ;READING OUTPUT OF CACHE HIT NAND GATE
 6778                                                               ;THRU CMR<8> DID NOT RESULT IN A 1
 6779 041542  000000                        .WORD   0
 6780 041544  000240                 10$:    NOP                     ;END OF TEST
      041546  005237  001472                 INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
6787                                    .SBTTL  TEST # 217 - CACHE READ HIT RESULTS IN PROPER OUTPUT
                                        ;;*****************************************************************
                                        ;*TEST 217      CACHE READ HIT RESULTS IN PROPER OUTPUT
                                        ;*      VERIFY THAT A CACHE READ HIT WILL RESULT IN DATA BEING READ
                                        ;*      FROM CACHE DATA STORE, ASSURING THAT THE CACHE HAS ISSUED A
                                        ;*      A CPU CLOCK RESTART SIGNAL.  ASSURE THAT ALL 0'S CAN BE CACHED
                                        ;*      OUT OF CACHE DATA STORE.
                                        ;;*****************************************************************
     041552                             TST217:
     041552  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     041554  041564                             .WORD   40$             ;TEST START LOCATION
     041556  070000                             .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
     041560  000000                             .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     041562  070106                             .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
     041564  012737  001015  177746  40$:       MOV     #OFF,CCR        ;DISABLE CACHE
     041572  004437  002452                     JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
     041576  042030                             .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

6788 041600  012701  040000             1$:     MOV     #40000,R1       ;ADDRESS 40000 TO R1
6789 041604  012702  060000                     MOV     #60000,R2       ;ADDRESS 60000 TO R2
6790 041610  012737  070076  000014             MOV     #3$-1$+70000,14 ;SETUP BPT TRAP VECTORS
6791 041616  012737  000340  000016             MOV     #340,16
6792 041624  005037  002070                     CLR     FAIL1           ;CLEAR ERROR FLAGS
6793 041630  005037  002072                     CLR     FAIL2
6794 041634  012706  060002                     MOV     #60002,SP       ;STACK POINTER NOW POINTS TO ADDRESS 60002
6795 041640  005037  060000                     CLR     60000           ;PRECONDITION MAIN MEMORY ADDRESS LOCATION
6796                                                                    ;60000 WITH ALL 0'S
6797 041644  012737  000340  177776             MOV     #340,PSW        ;PRECONDITION PSW TO 340
6798 041652  112737  000002  177750             MOVB    #HODO,CMR       ;HODO WILL ALLOW READ HITS AND UPDATES
6799                                                                    ;ONLY DURING THE DESTINATION MEMORY ACCESS
6800                                                                    ;OF AN INSTRUCTION.
6801                                                                    ;HODO DOES NOT ALLOW A CACHE UPDATE
6802                                                                    ;TO OCCUR DUE TO WRITE UPDATES.
6803 041660  012737  000011  177746             MOV     #11,CCR         ;NO BYPASS TO ALLOW WRITES TO CACHE STORES.
6804                                                                    ;ENABLE LOW CACHE
6805 041666  000257                             CCC                     ;CLEAR ALL CONDITION CODES
6806 041670  005711                             TST     (R1)            ;
6807 041672  005712                             TST     (R2)            ;CACHE READ UPDATE. WRITE ALL 0'S FROM
6808                                                                    ;MAIN MEMORY LOCATION TO CACHE DATA STORE
6809                                                                    ;LOCATION 0000.
6810 041674  000003                             BPT                     ;BREAKPOINT TRAP. DUE TO A TRAP,THE  PSW
6811                                                                    ;WILL BE WRITTEN TO THE STACK, WHICH NOW
6812                                                                    ;POINTS TO ADDRESS 60000.THE TRAP INSTRUCTION
6813                                                                    ;IS A NON-DESTINATION ACCESS INSTR.
6814                                                                    ;SINCE HODO IS BEING USED, A CACHE UPDATE
6815                                                                    ;WILL BE INHIBITED. MAIN MEMORY
6816                                                                    ;ADDRESS 60000 WILL CONTAIN PSW  DATA OF 344,AND
6817                                                                    ;THE LOCATION IN CACHE CORRESPONDING TO ADDRESS
6818                                                                    ;60000 WILL BE LEFT WITH ALL 0'S DATA.
6819 041676  042737  000002  177750  3$:       BIC     #HODO,CMR       ;TRAP TO HERE;DISABLE HODO
6820 041704  011200                             MOV     (R2),R0         ; WHEN THIS INSTRUCTION READS
6821                                                                    ;ADDRESS 60000
6822                                                                    ;A CACHE READ HIT SHOULD RESULT AND A CPU CLOCK
```

```
6823                                                    ;RESTART SIGNAL SHOULD BE ISSUED.
6824                                                    ;THE CPU SHOULD READ DATA FROM CACHE DATA STORE
6825                                                    ;RATHER THAN MAIN MEMORY.
6826 041706  000240            25$:    NOP             ;INSTRUCTION 'JMP 1$' PLACED HERE
     041710  000240                    NOP             ;FOR  LOOP ON ERROR
6827 041712  005700                    TST     R0      ;R0 SHOULD CONTAIN ALL 0'S
6828 041714  001410                    BEQ     7$      ;
6829 041716  022700  000344            CMP     #344,R0 ;DID THE CPU READ MAIN MEMORY?
6830 041722  001003                    BNE     6$      ;NO,MUST HAVE READ CACHE BUT BAD DATA WAS RECEIVED.
6831 041724  005237  002070            INC     FAIL1   ;INDICATE ERROR THAT MAIN MEMORY WAS READ
6832 041730  000402                    BR      7$
6833 041732  005237  002072    6$:     INC     FAIL2   ;INDICATE ERROR THAT DATA WAS CACHED BUT
6834                                                    ;BAD DATA WAS RECEIVED.
6835 041736  105037  177750    7$:     CLRB    CMR     ;DISABLE MAINTENANCE MODE
6836 041742  012737  001015  177746    MOV     #OFF,CCR ;DISABLE CACHE
6837 041750  012706  000500            MOV     #500,SP ;RESET STACK POINTER
6838 041754  012737  000016  000014    MOV     #16,14  ;RESTORE BPT VECTORS
6839 041762  005037  000016            CLR     16
6840 041766  005737  002070            TST     FAIL1   ;WAS MAIN MEMORY READ?
6841 042772  001404                    BEQ     8$      ;NO
6842 041774  104413                    ERROR           ;ERROR
                                                        ;-----
     041776  041774                    .WORD   .-2
6843                                                    ;CPU CLOCK RESTART-CACHED DATA TESTS
6844
6845                                                    ;ATTEMPTING TO CAUSE A READ HIT IN ORDER TO
6846                                                    ;CACHE DATA RESULTED IN MAIN MEMORY BEING READ
6847 042000  000000                    .WORD   0
6848 042002  000411                    BR      10$     ;NEXT TEST
6849 042004  005737  002072    8$:     TST     FAIL2   ;WAS BAD DATA CACHED FROM CACHE DATA STORE?
6850 042010  001406                    BEQ     10$     ;NO, NEXT TEST
6851 042012  010037  050520            MOV     R0,RECDAT ;SPECIFY DATA RECEIVED
6852 042016  104413                    ERROR           ;ERROR
                                                        ;-----
     042020  042016                    .WORD   .-2
6853                                                    ;CPU CLOCK RESTART-CACHED DATA TESTS
6854                                                    ;CREATING A READ HIT BY READING ADDRESS 60000
6855                                                    ;CACHED BAD DATA FROM CACHE DATA STORE
6856 042022  050520                    RECDAT          ;PRINT DATA RECEIVED
6857 042024  000000                    .WORD   0
6858 042026  000240            10$:    NOP             ;END OF TEST
     042030  005237  001472            INC     $TESTN  ;INCREMENT TEST COUNTER
```

```
6863                                    .SBTTL  TEST # 220 - FLOATING 1 CAN BE CACHED FROM DATA STORE
                                        ;;*****************************************************************
                                        ;*TEST 220      FLOATING 1 CAN BE CACHED FROM DATA STORE
                                        ;*      VERIFY THAT A FLOATING 1 ACROSS 0'S DATA PATTERN CAN BE CACHED
                                        ;*      FROM CACHE DATA STORE.
                                        ;;*****************************************************************
        042034                          TST220:
        042034  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
        042036  042046                          .WORD   40$             ;TEST START LOCATION
        042040  070016                          .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
        042042  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
        042044  070040                          .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
        042046  012737  001015  177746  40$:     MOV     #OFF,CCR        ;DISABLE CACHE
        042054  004437  002452                  JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
        042060  042176                          .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

6864 042062  012701  040000                    MOV     #40000,R1       ;ADDRESS 40000 TO R1
6865 042066  012702  060000                    MOV     #60000,R2       ;ADDRESS 60000 TO R2
6866 042072  012737  000001  050516            MOV     #1,FLTPAT       ;1ST FLOATING 1 PATTERN: 000001
6867 042100  013737  050516  060000  1$:       MOV     FLTPAT,60000    ;WRITE FLOATING 1 PATTERN TO MAIN MEMORY
6868                                                                    ;LOCATION 60000
6869 042106  012737  000011  177746            MOV     #11,CCR         ;NO BYPASS TO ALLOW WRITES TO CACHE STORES.
6870                                                                    ;ENABLE LOW CACHE
6871 042114  005711                            TST     (R1)            ;
6872 042116  005712                            TST     (R2)            ;CACHE READ UPDATE. WRITE FLOATING 1 PATTERN FROM
6873                                                                    ;MAIN MEMORY LOCATION TO CACHE DATA STORE
6874                                                                    ;LOCATION 0000.
6875 042120  011200                            MOV     (R2),R0         ;WHEN THIS INSTRUCTION READS
6876                                                                    ;ADDRESS 60000,A CACHE READ HIT SHOULD RESULT
6877                                                                    ;AND A CPU CLOCK RESTART SIGNAL SHOULD BE ISSUED.
6878                                                                    ;THE CPU SHOULD READ FLOATING 1 PATTERN FROM CACHE DATA STOR
6879                                                                    ;RATHER THAN MAIN MEMORY.
6880 042122  000240                  25$:      NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     042124  000240                            NOP                     ;FOR  LOOP ON ERROR
6881 042126  012737  001015  177746            MOV     #OFF,CCR        ;DISABLE CACHE
6882 042134  020037  050516                    CMP     R0,FLTPAT       ;WAS THE CORRECT FLOATING 1 PATTERN RECEIVED
6883 042140  001412                            BEQ     9$              ;PASS
6884 042142  010037  050520                    MOV     R0,RECDAT       ;GET DATA RECEIVED
6885 042146  013737  050516  050504            MOV     FLTPAT,EXDAT6   ;GET EXPECTED DATA
6886 042154  104413                            ERROR                   ;ERROR
                                                                        ;-----
     042156  042154                            .WORD   .-2
6887                                                                    ;CPU CLOCK RESTART-CACHED DATA TESTS
6888                                                                    ;CREATING A READ HIT BY READING ADDRESS 60000
6889                                                                    ;RESULTED IN INCORRECT FLOATING 1 PATTERN
6890                                                                    ;BEING CACHED FROM CACHE DATA STORE
6891 042160  050504                            EXDAT6                  ;PRINT FLOATING 1 PATTERN EXPECTED FROM THE
6892                                                                    ;READ HIT TO ADDRESS 60000
6893 042162  050520                            RECDAT                  ;PRINT DATA RECEIVED FROM READ HIT TO ADDRESS 60000
6894 042164  000000                            .WORD   0
6895 042166  006337  050516            9$:     ASL     FLTPAT          ;NEXT FLOATING 1 PATTERN
6896 042172  103342                            BCC     1$              ;IF FLOATING 1 PATTERN 100000 HAS NOT BEEN
6897                                                                    ;DONE ,CONTINUE.
```

```
 6898 042174  000240          10$:    NOP                 ;END OF TEST
      042176  005237  001472          INC     $TESTN      ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 221 - DMA WRITE HITS STOPS ALL CACHE STORE LOCS
                                ;;*****************************************************************
                                ;*TEST 221      DMA WRITE HITS STOPS ALL CACHE STORE LOCS
                                ;*      VERIFY THAT DMA WRITE HITS WILL INVALIDATE ALL OF LOW CACHE VALID
                                ;*      STORE LOCATIONS.
                                ;;*****************************************************************
 042202                         TST221:
 042202  000004                         SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                 ;ERROR/LOOP ON TEST
 042204  042214                         .WORD   40$             ;TEST START LOCATION
 042206  070270                         .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
 042210  000000                         .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
 042212  070410                         .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
 042214  012737  001015  177746 40$:    MOV     #OFF,CCR        ;DISABLE CACHE
 042222  004437  002452                 JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
 042226  042726                         .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE

6904 042230  032737  020000  177746         BIT     #VSIU,CCR       ;IS SET A BEING USED?
6905 042236  001407                         BEQ     7$              ;YES
6906 042240  052737  000400  177746         BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET A
6907 042246  032737  010000  177746 500$:   BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
6908 042254  001374                         BNE     500$
6909 042256  012705  060000         7$:     MOV     #60000,R5       ;;ADDRESS 60000 INTO R5
6910 042262  012703  040000                 MOV     #40000,R3       ;ADDRESS 40000 INTO R3
6911 042266  132737  000200  001507         BITB    #APTSIZE,$ENVM  ;WILL APT SIZE?
6912 042274  001405                         BEQ     3$              ;NO,GO AUTOSIZE
6913 042276  032737  010000  001512         BIT     #10000,$USWR    ;DOES APT SAY TO PERFORM TEST
6914 042304  001426                         BEQ     11$             ;APT SAYS DO NOT PERFORM TEST
6915 042306  000504                         BR      1$              ;APT SAYS DO TEST
6916 042310  012737  070116  000004 3$:     MOV     #5$-40$+67764,4 ;SETUP FOR TRAP
6917 042316  012737  000340  000006         MOV     #340,6
6918 042324  005737  170006                 TST     BECR1           ;ACCESS UNIBUS EXERCISER
6919 042330  000240                         NOP
6920 042332  012737  000006  000004         MOV     #6,4            ;RESTORE VECTORS
6921 042340  005037  000006                 CLR     6
6922 042344  000465                         BR      1$              ;UNIBUS EXERCISER IS PRESENT;PROCEED WITH TEST
6923 042346  022626                 5$:     CMP     (SP)+,(SP)+     ;TRAP RETURN;EXERCISER NOT PRESENT
6924 042350  012737  000006  000004         MOV     #6,4            ;RESTORE VECTORS
6925 042356  005037  000006                 CLR     6
6926 042362  005737  001474         11$:    TST     $PASS           ;IS THI SFIRST PASS?
6927 042366  001156                         BNE     10$             ;SKIP MESSAGE;SKIP TEST
6928 042370  023737  000042  000046         CMP     42,46           ;IS THIS ACT11 QV OR AUTO ACCEPT?
6929 042376  001552                         BEQ     10$             ;YES SKIP TYPEOUT
6930 042400  104401  042406                 TYPE    ,65$            ;;TYPE ASCIZ STRING
     042404  000402                         BR      64$             ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <CRLF><CRLF>
 042412                         64$:
6931 042412  104401  042420                 TYPE    ,67$            ;;TYPE ASCIZ STRING
     042416  000432                         BR      66$             ;;GET OVER THE ASCIZ
                                ;;67$:  .ASCIZ  /UNIBUS  EXERCISER NOT USED- DMA TESTS NOT PERFORMED/
 042504                         66$:
6932 042504  104401  042512                 TYPE    ,69$            ;;TYPE ASCIZ STRING
     042510  000402                         BR      68$             ;;GET OVER THE ASCIZ
                                ;;69$:  .ASCIZ  <CRLF><CRLF>
```

```
        042516                          68$:
 6933   042516  000502                          BR      10$
 6934   042520  012737  000015  177746  1$:     MOV     #15,CCR         ;NO UCB SO AS TO WRITE ENABLE VALID STORE
 6935   042526  112737  000002  177750          MOVB    #HODO,CMR       ;HODO ALLOWS UPDATES ONLY DURING THE
 6936                                                                    ;DESTINATION ACCESS OF AN INSTRUCTION
 6937   042534  005723                  2$:     TST     (R3)+
 6938   042536  005725                          TST     (R5)+           ;UPDATE ALL LOW CACHE LOCATIONS MAKING
 6939                                                                    ;ALL VALID STORE  LOCATIONS =1
 6940   042540  022705  070000                  CMP     #70000,R5       ;COMPLETE?
 6941   042544  001373                          BNE     2$              ;NO
 6942   042546  042737  000002  177750          BIC     #HODO,CMR       ;CLEAR HODO SO VALID STORE CAN BE WRITTEN
 6943                                                                    ;BY UNIBUS EXERCISER.
 6944   042554  012705  060000                  MOV     #60000,R5       ;ADDRESS 60000 INTO R5
 6945   042560  012737  060000  170004          MOV     #60000,BEBA     ;SETUP UNIBUS EXERCISER
 6946                                                                    ;ADRESS
 6947   042566  012737  174000  170002          MOV     #-4000,BECC     ;TRANSFER COUNT
 6948   042574  012737  177777  170000          MOV     #177777,BEDA    ;DATA FOR WRITE XFER
 6949   042602  012737  000000  170016          MOV     #0,BECR2        ;SETUP CONTROL REGISTER 2
 6950   042610  012737  003045  170006          MOV     #3045,BECR1     ;SETUP CONTROL REGISTER 1;START XFER
 6951   042616  105737  170006          4$:     TSTB    BECR1           ;WAIT FOR EXERCISER TO COMPLETE
 6952   042622  100375                          BPL     4$
 6953   042624  052737  000002  177750  6$:     BIS     #HODO,CMR       ;IMPLEMENT HODO. ALLOWS VALID STORE
 6954                                                                    ;DATA TO BE WRITTEN TO CMR<12> ONLY
 6955                                                                    ;DURING THE DESTINATION MEMORY ACCESS
 6956                                                                    ;OF AN INSTRUCTION.
 6957   042632  005715                          TST     (R5)            ;READ LOW CACHE ADDRESS
 6958                                                                    ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
 6959                                                                    ;WRITE VALID STORE DATA INTO CMR<12>
 6960                                                                    ;FROM VALID STORE ADDRESS LOCATION
 6961                                                                    ;JUST READ.
 6962   042634  013701  177750                  MOV     CMR,R1          ;SAVE CMR DATA
 6963   042640  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
        042642  000240                          NOP                     ;FOR  LOOP ON ERROR
 6964   042644  012737  001015  177746          MOV     #OFF,CCR        ;DISABLE CACHE
 6965   042652  105037  177750                  CLRB    CMR             ;DISABLE MAINTENANCE
 6966   042656  032701  010000                  BIT     #VLD,R1         ;CMR<12> SHOULD BE 0.
 6967   042662  001411                          BEQ     9$              ;PASS
 6968   042664  010537  050506                  MOV     R5,CA121        ;SAVE VALID STORE ADDRESS LOCATION
 6969                                                                    ;USED: CA<12:1>
 6970   042670  006237  050506                  ASR     CA121           ;PREPARE CA121 FOR TYPEOUT
 6971   042674  104413                          ERROR                   ;ERROR
                                                                        ;-----
        042676  042674                          .WORD   .-2
 6972                                                                    ;DMA TESTS
 6973                                                                    ;READING VALID STORE DATA
 6974                                                                    ;THRU CMR<12> DID NOT RESULT IN 0.
 6975                                                                    ;THIS INDICATES THAT VALID STORE WAS
 6976                                                                    ;NOT INVALIDATED DUE TO DMA WRITE HIT.
 6977   042700  050506                          CA121                   ;PRINT VALID STORE ADDRESS LOCATION
 6978                                                                    ;USED: CA<12:1>.
 6979   042702  000000                          .WORD   0
 6980   042704  000407                          BR 10$                  ;IF ERROR END TEST
 6981   042706  062705  000002          9$:     ADD     #2,R5           ;NEXT VALID STORE LOCATION
 6982   042712  062703  000002                  ADD     #2,R3
 6983   042716  020527  070000                  CMP     R5,#70000       ;HAVE ALL LOW CACHE ADDRESS LOCATIONS
 6984                                                                    ;BEEN DONE?
 6985   042722  001340                          BNE     6$              ;NO
```

```
 6986 042724  000240                    10$:   NOP                    ;END OF TEST
      042726  005237  001472                   INC    $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 222 - DMA WRITE CAUSES TIMEOUT & CCR REG NOT ALTERED
                                ;;*****************************************************************
                                ;*TEST 222      DMA WRITE CAUSES TIMEOUT & CCR REG NOT ALTERED
                                ;*      VERIFY THAT A DMA WRITE TO CCR REGISTER WILL RESULT IN A TIMEOUT
                                ;*              AND THAT THE CCR REGISTER WILL NOT BE ALTERED
                                ;;*****************************************************************
042732                          TST222:
042732  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
042734  042744                          .WORD   40$             ;TEST START LOCATION
042736  070134                          .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
042740  000000                          .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
042742  070276                          .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
042744  012737  001015  177746  40$:    MOV     #OFF,CCR        ;DISABLE CACHE
042752  004437  002452                  JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
042756  043322                          .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE

6992 042760  032737  020000  177746          BIT     #VSIU,CCR       ;IS SET A BEING USED?
6993 042766  001407                          BEQ     7$              ;YES
6994 042770  052737  000400  177746          BIS     #FC,CCR         ;NO; FLUSH CACHE FOR SET A
6995 042776  032737  010000  177746  500$:   BIT     #VCIP,CCR       ;WAIT TILL FLUSH COMPLETE
6996 043004  001374                          BNE     500$
6997 043006  012705  060000          7$:     MOV     #60000,R5       ;;ADDRESS 60000 INTO R5
6998 043012  012703  040000                  MOV     #40000,R3       ;ADDRESS 40000 INTO R3
6999 043016  132737  000200  001507          BITB    #APTSIZE,$ENVM  ;WILL APT SIZE?
7000 043024  001405                          BEQ     3$              ;NO,GO AUTOSIZE
7001 043026  032737  010000  001512          BIT     #10000,$USWR    ;DOES APT SAY TO PERFORM TEST
7002 043034  001426                          BEQ     11$             ;APT SAYS DO NOT PERFORM TEST
7003 043036  000426                          BR      1$              ;APT SAYS DO TEST
7004 043040  012737  070116  000004  3$:     MOV     #5$-40$+67764,4 ;SETUP FOR TRAP
7005 043046  012737  000340  000006          MOV     #340,6
7006 043054  005737  170006                  TST     BECR1           ;ACCESS UNIBUS EXERCISER
7007 043060  000240                          NOP
7008 043062  012737  000006  000004          MOV     #6,4            ;RESTORE VECTORS
7009 043070  005037  000006                  CLR     6
7010 043074  000407                          BR      1$              ;UNIBUS EXERCISER  IS PRESENT;PROCEED WITH TEST
7011 043076  022626                  5$:     CMP     (SP)+,(SP)+     ;TRAP RETURN;EXERCISER NOT PRESENT
7012 043100  012737  000006  000004          MOV     #6,4            ;RESTORE VECTORS
7013 043106  005037  000006                  CLR     6
7014 043112  000502                  11$:    BR      10$             ;SKIP TEST
7015 043114  012737  000015  177746  1$:     MOV     #15,CCR         ;CACHE OFF-DISABLE INTERRUPT
7016 043122  012737  070256  000510          MOV     #6$-40$+67764,510;SETUP RETURN ADDRESS FOR
7017                                                                ;A UNIBUS EXER, TRAP
7018 043130  012737  000340  000512          MOV     #340,512        ;
7019 043136  012737  177746  170004          MOV     #177746,BEBA    ;SETUP UNIBUS EXERCISER ADRESS
7020 043144  012737  177777  170002          MOV     #-1,BECC        ;TRANSFER COUNT
7021 043152  012737  001015  170000          MOV     #1015,BEDA      ;DATA FOR WRITE XFER
7022 043160  012737  000003  170016          MOV     #3,BECR2        ;SETUP CONTROL REGISTER 2
7023 043166  012737  003045  170006          MOV     #3045,BECR1     ;SETUP CONTROL REGISTER 1;START XFER
7024 043174  105737  170006          4$:     TSTB    BECR1           ;WAIT FOR EXERCISER TO COMPLETE
7025 043200  100375                          BPL     4$
7026 043202  012737  001000  002062          MOV     #1000,LOOP      ;GIVE ENOUGH TIME FOR TIMEOUT TO OCCUR
7027 043210  005337  002062          2$:     DEC     LOOP
7028 043214  001375                          BNE     2$
```

```
7029 043216 013700 170016          MOV     BECR2,R0        ;SAVE UBE ERROR REGISTER CONTENTS
7030 043222 013701 177746          MOV     CCR,R1          ;SAVE CCR CONTENTS
7031 043226 005037 177776          CLR     PSW             ;ALLOW INTERRUPT TO OCCUR
7032 043232 000240                 NOP
7033 043234 000401                 BR      8$
7034 043236 022626           6$:   CMP     (SP)+,(SP)+     ;TRAP TO HERE;ADJUST STACK
7035 043240 012737 000512 000510 8$:   MOV     #512,510        ;RESTORE VECTORS
7036 043246 005037 000512          CLR     512             ;
7037 043252 005037 170010          CLR     170010          ;CLEAR ERROR REGISTER
7038 043256 000240           25$:  NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     043260 000240                 NOP                     ;FOR  LOOP ON ERROR
7039 043262 012737 001015 177746   MOV     #OFF,CCR        ;DISABLE CACHE
7040 043270 032700 000400          BIT     #400,R0         ;SLAVE SYNC ERROR BIT SHOULD BE SET
7041 043274 001003                 BNE     9$              ;PASS
7042 043276 104413                 ERROR                   ;ERROR
                                                           ;-----
     043300 043276                 .WORD   .-2
7043                                                       ;DMA TESTS
7044                                                       ;ATTEMPTING A DMA WRITE TO CCR REGISTER
7045                                                       ;DID NOT RESULT IN A SSYNC TIMEOUT
7046                                                       ;OF THE UBE
7047 043302 000000                 .WORD   0
7048 043304 032701 001000    9$:   BIT     #1000,R1        ;CCR BIT 9 SHOULD NOT HAVE  BEEN WRITTEN TO
7049                                                       ;BY THE UBE
7050 043310 001403                 BEQ     10$             ;PASS
7051 043312 104413                 ERROR                   ;ERROR
                                                           ;-----
     043314 043312                 .WORD   .-2
7052                                                       ;DMA TESTS
7053                                                       ;ATTEMPTING A DMA WRITE TO CCR
7054                                                       ;WROTE A 1 TO CCR BIT 9
7055 043316 000000                 .WORD   0
7056 043320 000240           10$:  NOP                     ;END OF TEST
     043322 005237 001472          INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 223 - ALL 6 HIT REG BITS READ 0 DUE TO 6 READ MISSES
                                ;;*********************************************************************
                                ;*TEST 223      ALL 6 HIT REG BITS READ 0 DUE TO 6 READ MISSES
                                ;*      CHECK THAT ALL SIX HIT REGISTER BITS CAN READ 0 DUE TO SIX
                                ;*      READ MISSES
                                ;;*********************************************************************
                                TST223:
 043326
 043326  000004                         SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                 ;ERROR/LOOP ON TEST
 043330  043340                         .WORD   40$             ;TEST START LOCATION
 043332  070010                         .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
 043334  000000                         .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
 043336  070046                         .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
 043340  012737  001015  177746  40$:    MOV     #OFF,CCR        ;DISABLE CACHE
 043346  004437  002452                 JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
 043352  043466                         .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                ;ARE RELOCATED TO HI CACHE SPACE

7062 043354  012700  040000             MOV     #40000,R0       ;ADDR. 40000 TO R0
7063 043360  012701  060000             MOV     #60000,R1       ;ADDR 60000 TO R1
7064 043364  112737  000002  177750 1$:  MOVB    #HODO,CMR       ;HODO ALLOWS HIT REGISTER TO BE CLOCKED
7065                                                            ;ONLY DURING THE DESTINATION ACCESS
7066                                                            ;OF AN INSTRUCTION.
7067 043372  012737  000015  177746      MOV     #15,CCR         ;NO UCB SO AS TO WRITE CACHE STORES
7068 043400  005710                     TST     (R0)
7069 043402  005711                     TST     (R1)            ;READ MISS
7070 043404  005710                     TST     (R0)            ;READ MISS
7071 043406  005711                     TST     (R1)            ;READ MISS
7072 043410  005710                     TST     (R0)            ;READ MISS
7073 043412  005711                     TST     (R1)            ;READ MISS
7074 043414  005710                     TST     (R0)            ;READ MISS
7075 043416  013702  177752             MOV     CHR,R2          ;SAVE CHR CONTENTS
7076 043422  000240              25$:   NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     043424  000240                     NOP                     ;FOR  LOOP ON ERROR
7077 043426  012737  001015  177746      MOV     #OFF,CCR        ;DISABLE CACHE
7078 043434  105037  177750             CLRB    CMR             ;DISABLE MAINTENANCE MODE
7079 043440  042702  177700             BIC     #177700,R2      ;PREPARE R2 FOR CHECK
7080 043444  005702                     TST     R2              ;CHR<5:0> SHOULD HAVE BEEN ALL 0'S
7081 043446  001406                     BEQ     10$             ;PASS
7082 043450  010237  050524             MOV     R2,CHR50        ;PREPARE FOR ERROR REPORT
7083 043454  104413                     ERROR                   ;ERROR
                                                                ;-----
     043456  043454                     .WORD   .-2
7084                                                            ;CHR<5:0> DID NOT INDICATE ALL 0'S
7085                                                            ;DUE TO SIX READ MISSES
7086 043460  050524             CHR50                          ;PRINT CHR<5:0> RECEIVED
7087 043462  000000                     .WORD   0
7088 043464  000240              10$:   NOP                     ;END OF TEST
     043466  005237  001472             INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 224 - BIT 05 OF HIT REG CONTAINS 1 WITH 1 HIT, 5 MISSES

```
7093                                    .SBTTL  TEST # 224 - BIT 05 OF HIT REG CONTAINS 1 WITH 1 HIT, 5 MISSES
                                        ;;*****************************************************************
                                        ;*TEST 224      BIT 05 OF HIT REG CONTAINS 1 WITH 1 HIT, 5 MISSES
                                        ;*      VERIFY THAT BIT 05 OF CACHE HIT REGISTER CAN CONTAIN A 1 DUE TO
                                        ;*      ONE READ HIT FOLLOWED BY FIVE READ MISSES
                                        ;;*****************************************************************
      043472                            TST224:
      043472  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      043474  043504                            .WORD   40$             ;TEST START LOCATION
      043476  070010                            .WORD   1$-40$+67764    ;LOOP ON ERROR START LOCATION
      043500  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      043502  070046                            .WORD   25$-40$+67764   ;LOOP ON ERROR END LOCATION
      043504  012737  001015  177746  40$:      MOV     #OFF,CCR        ;DISABLE CACHE
      043512  004437  002452                    JSR     R4,RELCTH       ;LOCATE TEST CODE TO HIGH CACHE SPACE
      043516  043634                            .WORD   10$+2           ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
                                        ;ARE RELOCATED TO HI CACHE SPACE

7094  043520  012700  040000                    MOV     #40000,R0       ;ADDR. 40000 TO R0
7095  043524  012701  060000                    MOV     #60000,R1       ;ADDR 60000 TO R1
7096  043530  112737  000002  177750  1$:       MOVB    #HODO,CMR       ;HODO ALLOWS HIT REGISTER TO BE CLOCKED
7097                                                                    ;ONLY DURING THE DESTINATION ACCESS
7098                                                                    ;OF AN INSTRUCTION.
7099  043536  012737  000015  177746            MOV     #15,CCR         ;NO UCB SO AS TO WRITE CACHE STORES
7100  043544  005710                            TST     (R0)
7101  043546  005710                            TST     (R0)            ;READ HIT
7102  043550  005711                            TST     (R1)            ;READ MISS
7103  043552  005710                            TST     (R0)            ;READ MISS
7104  043554  005711                            TST     (R1)            ;READ MISS
7105  043556  005710                            TST     (R0)            ;READ MISS
7106  043560  005711                            TST     (R1)            ;READ MISS
7107  043562  013702  177752                    MOV     CHR,R2          ;SAVE CHR CONTENTS
7108  043566  000240                  25$:      NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      043570  000240                            NOP                     ;FOR  LOOP ON ERROR
7109  043572  012737  001015  177746            MOV     #OFF,CCR        ;DISABLE CACHE
7110  043600  105037  177750                    CLRB    CMR             ;DISABLE MAINTENANCE MODE
7111  043604  042702  177700                    BIC     #177700,R2      ;PREPARE R2 FOR CHECK
7112  043610  022702  000040                    CMP     #40,R2          ;BIT 05 SHOULD BE 1
7113  043614  001406                            BEQ     10$             ;PASS
7114  043616  010237  050524                    MOV     R2,CHR50        ;PREPARE FOR ERROR REPORT
7115  043622  104413                            ERROR                   ;ERROR
                                                                        ;-----
      043624  043622                            .WORD   .-2
7116                                                                    ;CHR BIT 05 DID NOT READ 1 DUE
7117                                                                    ;TO ONE READ HIT AND 5 READ MISSES
7118  043626  050524                  CHR50     :PRINT CHR<5:0> RECEIVED
7119  043630  000000                            .WORD   0
7120  043632  000240                  10$:      NOP                     ;END OF TEST
      043634  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

TEST # 225 - EXERCISE CACHE BY READING MEMORY LOCATIONS

```
7127                                    .SBTTL  TEST # 225 - EXERCISE CACHE BY READING MEMORY LOCATIONS
                                        ;;*********************************************************************
                                        ;*TEST 225      EXERCISE CACHE BY READING MEMORY LOCATIONS
                                        ;*      THIS TEST EXERCISES CACHE BY READING MEMORY LOCATIONS FROM
                                        ;*      60000 TO 77776 WITH CACHE ON. ALL 4K OF CACHE WILL HAVE BEEN
                                        ;*      EXERCISED. EACH ADDRESS FROM 60000 TO 77776 IS LOADED WITH
                                        ;*      DATA CORRESPONDING TO ITS OWN ADDRESS.
                                        ;;*********************************************************************
      043640                            TST225:
      043640  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      043642  043652                            .WORD   40$             ;TEST START LOCATION
      043644  043652                            .WORD   1$              ;LOOP ON ERROR START LOCATION
      043646  000000                            .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      043650  043762                            .WORD   25$             ;LOOP ON ERROR END LOCATION
      043652                            40$:
7128  043652  012700  060000            1$:     MOV     #60000,R0       ;FIRST ADDRESS
7129  043656  010010                    2$:     MOV     R0,(R0)         ;FILL MEMORY WITH ADDRESSES
7130  043660  005720                            TST     (R0)+           ;
7131  043662  020027  077776                    CMP     R0,#77776
7132  043666  101773                            BLOS    2$
7133  043670  012700  060000                    MOV     #60000,R0       ;FIRST ADDRESS
7134  043674  005037  177746                    CLR     177746          ;ENABLE CACHE
7135  043700  005110                    3$:     COM     (R0)            ;DOUBLE COMPLEMENT DATA AND
7136  043702  005110                            COM     (R0)            ;MAKE SURE IT IS IN THE CACHE
7137  043704  011005                            MOV     (R0),R5         ;CREATE READ HIT;STORE CACHED DATA IN R5
7138  043706  020500                            CMP     R5,R0           ;CHECK RESULTS
7139  043710  001420                            BEQ     5$              ;PASS
7140  043712  012737  001015  177746            MOV     #OFF,CCR        ;DISABLE CACHE
7141  043720  010037  050530                    MOV     R0,FAILAD       ;SAVE FAILED ADDRESS
7142  043724  010037  050504                    MOV     R0,EXDAT6       ;GET EXPECTED DATA
7143  043730  010537  050520                    MOV     R5,RECDAT       ;GET RECEIVED DATA
7144  043734  104413                            ERROR                   ;ERROR
                                                                        ;-----
      043736  043734                            .WORD   .-2
7145  043740  050530                            FAILAD                  ;PRINT FAILED ADDRESS
7146  043742  050504                            EXDAT6                  ;PRINT EXPECTED DATA
7147  043744  050520                            RECDAT                  ;PRINT RECEIVED DATA
7148  043746  000000                            .WORD   0
7149  043750  000404                            BR      25$             ;
7150  043752  005720                    5$:     TST     (R0)+           ;NEXT ADDRESS
7151  043754  020027  077776                    CMP     R0,#77776       ;FINISHED?
7152  043760  101747                            BLOS    3$              ;CONTINUE
7153  043762  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      043764  000240                            NOP                     ;FOR  LOOP ON ERROR
7154  043766  000240                    10$:    NOP                     ;END OF TEST
      043770  005237  001472                    INC     $TESTN          ;INCREMENT TEST COUNTER
```

```
                                .SBTTL  TEST # 226 - ASRB INST CAUSES CACHE BYPASS WITH READ HIT
                                ;;*****************************************************************
                                ;*TEST 226      ASRB INST CAUSES CACHE BYPASS WITH READ HIT
                                ;*      TEST DESCRIPTION:
                                ;*      VERIFY THAT THE ASRB INSTRUCTION WILL CAUSE A CACHE BYPASS
                                ;*      UNDER A READ HIT CONDITION.
                                ;;*****************************************************************
      043774                    TST226:
      043774  000004                    SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                 ;ERROR/LOOP ON TEST
      043776  044006                    .WORD   40$             ;TEST START LOCATION
      044000  044006                    .WORD   1$              ;LOOP ON ERROR START LOCATION
      044002  000000                    .WORD   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      044004  044036                    .WORD   25$             ;LOOP ON ERROR END LOCATION
      044006                    40$:
 7161 044006  012700  060000    1$:     MOV     #60000,R0       ;SETUP TEST LOCATION ADDRESS IN R0
 7162 044012  112737  000002  177750    MOVB    #2,177750       ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AND
 7163                                                            ;CLOCKING OF OUTPUT OF CACHE HIT NAND
 7164                                                            ;GATE INTO CMR ONLY DURING THE DESTINATION
 7165                                                            ;ACCESS OF AN INSTRUCTION.
 7166 044020  012737  000011  177746    MOV     #11,177746      ;NO UCB SO AS TO WRITE CACHE STORES
 7167                                                            ;ENABLE LOW CACHE FOR A READ HIT
 7168 044026  005710                    TST     (R0)            ;READING LOCATION SPECIFIED BY R0
 7169                                                            ;WILL ASSURE A READ HIT WHEN THE
 7170                                                            ;LOCATION IS READ AGAIN
 7171 044030  106210                    ASRB    (R0)            ;ASRB INSTRUCTION WILL CAUSE A BYPASS
 7172                                                            ;TO OCCUR INHIBITING A READ HIT
 7173                                                            ;TO LOCATION SPECIFIED BY R0.
 7174                                                            ;THIS SITUATION WILL RESULT IN CMR
 7175                                                            ;BIT 8 BEING A 1.
 7176 044032  013701  177750            MOV     177750,R1       ;SAVE CMR CONTENTS
 7177 044036  000240            25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      044040  000240                    NOP                     ;FOR  LOOP ON ERROR
 7178 044042  105037  177750            CLRB    177750          ;DISABLE MAINT MODE
 7179 044046  012737  000000  177746    MOV     #0,177746       ;TURN ON CACHE
 7180 044054  032701  000400            BIT     #400,R1         ;WAS CMR BIT 8 A 1
 7181 044060  001003                    BNE     10$             ;PASS
 7182 044062  104413                    ERROR                   ;ERROR
                                                                 ;-----
      044064  044062                    .WORD   .-2
 7183                                                            ;CACHE BYPASS DID NOT OCCUR OR
 7184                                                            ;SEQUENCE ERROR
 7185                                                            ;READING OUTPUT OF CACHE HIT NAND GATE
 7186                                                            ;THRU CMR<8> DID NOT RESULT IN A 1
 7187 044066  000000                    .WORD   0
 7188 044070  000240            10$:    NOP                     ;END OF TEST
      044072  005237  001472            INC     $TESTN          ;INCREMENT TEST COUNTER
 7189                                   ;;*****************************************************************
 7190 044076  005737  001474    ENDPAS: TST     $PASS           ;IS THIS FIRST PASS?
 7191 044102  001412                    BEQ     1$              ;YES; INHIBIT ITERATIONS
 7192 044104  032777  004000  135762    BIT     #BIT11,@SWR     ;IS INHIBIT ITERATIONS IMPLEMENTED
 7193                                                            ;THRU SWITCH REGISTER?
 7194 044112  001006                    BNE     1$              ;YES
 7195 044114  005237  044240            INC     $ICNT           ;INCREMENT PASS ITERATION COUNTER
 7196 044120  023737  044236  044240    CMP     $TIMES,$ICNT    ;HAVE ALL ITERATIONS BEEN COMPLETED?
 7197 044126  001041                    BNE     $DOAGN          ;NO,REPEAT PROGRAM
 7198 044130  005037  001472    1$:     CLR     $TESTN          ;CLEAR TEST NUMBER COUNTER
```

TEST # 226 - ASRB INST CAUSES CACHE BYPASS WITH READ HIT

```
7199 044134  005037  044240                    CLR     $ICNT             ;CLEAR PASS ITERATION COUNTER
7200 044140  005237  001474                    INC     $PASS             ;INCREMENT PASS COUNT
7201 044144  042737  100000  001474            BIC     #100000,$PASS     ;DON'T ALLW A NEGATIVE #
7202 044152  104401  044160                    TYPE    ,65$              ;;TYPE ASCIZ STRING
     044156  000410                            BR      64$               ;;GET OVER THE ASCIZ
                                  ;;65$:      .ASCIZ  <CRLF>/END OF PASS # /
     044200                       64$:
7203 044200  013746  001474                    MOV     $PASS,-(SP)       ;;SAVE $PASS FOR TYPEOUT
     044204  104405                            TYPDS                     ;;GO TYPE--DECIMAL ASCII WITH SIGN
7204 044206  104401  002122                    TYPE    ,$ENULL
7205 044212  013700  000042                    MOV     42,R0
7206 044216  001405                            BEQ     $DOAGN
7207 044220  000005                            RESET
7208 044222  004710                 $ENDAD:    JSR     PC,(R0)
7209 044224  000240                            NOP
7210 044226  000240                            NOP
7211 044230  000240                            NOP
7212 044232  000137  002500         $DOAGN:    JMP     BEGIN             ;START AGAIN
7213
7214 044236  000012                 $TIMES:    .WORD   10.
7215 044240  000000                 $ICNT:     .WORD   0
```

```
7216                                    .SBTTL  TYPE ROUTINE
                                        ;;*****************************************************************
                                        ;*ROUTINE TO TYPE ASCIZ MESSAGE. MESSAGE MUST TERMINATE WITH A 0 BYTE.
                                        ;*THE ROUTINE WILL INSERT A NUMBER OF NULL CHARACTERS AFTER A LINE FEED.
                                        ;*NOTE1:         $NULL CONTAINS THE CHARACTER TO BE USED AS THE FILLER CHARACTER.
                                        ;*NOTE2:         $FILLS CONTAINS THE NUMBER OF FILLER CHARACTERS REQUIRED.
                                        ;*NOTE3:         $FILLC CONTAINS THE CHARACTER TO FILL AFTER.
                                        ;*
                                        ;*CALL:
                                        ;*1) USING A TRAP INSTRUCTION
                                        ;*       TYPE    ,MESADR         ;;MESADR IS FIRST ADDRESS OF AN ASCIZ STRING
                                        ;*OR
                                        ;*       TYPE
                                        ;*       MESADR
                                        ;*
044242  105737  002111          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
044246  100002                          BPL     1$              ;;BR IF YES
044250  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
044252  000430                          BR      3$              ;;LEAVE
044254  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
044256  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
044262  122737  000001  001506          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
044270  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
044272  132737  000100  001507          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
044300  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
044302  010037  044312                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
044306  004737  001620                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
044312  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
044314  132737  000040  001507  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
044322  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
044324  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
044326  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
044330  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
044332  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
044334  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
044340  000002                          RTI                     ;;RETURN
044342  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
044346  001430                          BEQ     8$
044350  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
044354  001006                          BNE     5$
044356  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
044360  104401                          TYPE                    ;;TYPE A CR AND LF
044362  002117                          $CRLF
044364  105037  044602                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
044370  000755                          BR      2$              ;;GET NEXT CHARACTER
044372  004737  044454          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
044376  123726  002110          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
044402  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
044404  013746  002106                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                                ;;AND THE NULL CHAR.
044410  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
044414  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
044416  004737  044454                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
044422  105337  044602                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
044426  000770                          BR      7$              ;;LOOP
                                        ;HORIZONTAL TAB PROCESSOR
044430  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
```

```
044434  004737  044454          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
044440  132737  000007  044602          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
044446  001372                          BNE     9$              ;;TAB STOP
044450  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
044452  000724                          BR      2$              ;;GET NEXT CHARACTER
044454                          $TYPEC:
044454  105777  135416                  TSTB    @$TKS           ;;CHAR IN KYBD BUFFER?          ;MJD001
044460  100022                          BPL     10$             ;;BR IF NOT                     ;MJD001
044462  017746  135412                  MOV     @$TKB,-(SP)     ;;GET CHAR                      ;MJD001
044466  042716  177600                  BIC     #177600,(SP)    ;;STRIP EXTRANEOUS BITS         ;MJD001
044472  122716  000023                  CMPB    #$XOFF,(SP)     ;;WAS CHAR XOFF                 ;MJD001
044476  001012                          BNE     102$            ;;BR IF NOT                     ;MJD001
044500                          101$:                                                           ;MJD001
044500  105777  135372                  TSTB    @$TKS           ;;WAIT FOR CHAR                 ;MJD001
044504  100375                          BPL     101$                                            ;MJD001
044506  117716  135366                  MOVB    @$TKB,(SP)      ;;GET CHAR                      ;MJD001
044512  042716  177600                  BIC     #177600,(SP)    ;;STRIP IT                      ;MJD001
044516  122716  000021                  CMPB    #$XON,(SP)      ;;WAS IT XON?                   ;MJD001
044522  001366                          BNE     101$            ;;BR IF NOT                     ;MJD001
044524                          102$:                                                           ;MJD001
044524  005726                          TST     (SP)+           ;;FIX STACK                     ;MJD001
044526                          10$:                                                            ;MJD001
044526  105777  135350                  TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
044532  100375                          BPL     10$                                             ;MJD001
044534  126627  000002  000021          CMPB    2(SP),#$XON     ;;IS CHARACTER A RANDOM XON?    ;RAN001
044542  001420                          BEQ     $TYPEX          ;;BRANCH IF YES                 ;RAN001
044544  116677  000002  135332          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
044552  122766  000015  000002          CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
044560  001003                          BNE     1$              ;;BRANCH IF NO
044562  105037  044602                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
044566  000406                          BR      $TYPEX          ;;EXIT
044570  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
044576  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
044600  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
044602  000000                  $CHARCNT:.WORD  0               ;;CHARACTER COUNT STORAGE
044604  000207                  $TYPEX: RTS     PC
```

```
7218                                    .SBTTL  BINARY TO OCTAL (ASCII) AND TYPE
                                        ;;**********************************************************************
                                        ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 6-DIGIT
                                        ;*OCTAL (ASCII) NUMBER AND TYPE IT.
                                        ;*$TYPOS---ENTER HERE TO SETUP SUPPRESS ZEROS AND NUMBER OF DIGITS TO TYPE
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                        ;*      TYPOS                   ;;CALL FOR TYPEOUT
                                        ;*      .BYTE   N               ;;N=1 TO 6 FOR NUMBER OF DIGITS TO TYPE
                                        ;*      .BYTE   M               ;;M=1 OR 0
                                        ;*                                      ;;1=TYPE LEADING ZEROS
                                        ;*                                      ;;0=SUPPRESS LEADING ZEROS
                                        ;*
                                        ;*$TYPON----ENTER HERE TO TYPE OUT WITH THE SAME PARAMETERS AS THE LAST
                                        ;*$TYPOS OR $TYPOC
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                        ;*      TYPON                   ;;CALL FOR TYPEOUT
                                        ;*
                                        ;*$TYPOC---ENTER HERE FOR TYPEOUT OF A 16 BIT NUMBER
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)       ;;NUMBER TO BE TYPED
                                        ;*      TYPOC                   ;;CALL FOR TYPEOUT
044606  017646  000000          $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
044612  116637  000001  045031          MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
044620  112637  045033                  MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
044624  062716  000002                  ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
044630  000406                          BR      $TYPON
044632  112737  000001  045031  $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
044640  112737  000006  045033          MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
044646  112737  000005  045030  $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
044654  010346                          MOV     R3,-(SP)        ;;SAVE R3
044656  010446                          MOV     R4,-(SP)        ;;SAVE R4
044660  010546                          MOV     R5,-(SP)        ;;SAVE R5
044662  113704  045033                  MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
044666  005404                          NEG     R4
044670  062704  000006                  ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
044674  110437  045032                  MOVB    R4,$OMODE       ;;SAVE IT FOR USE
044700  113704  045031                  MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
044704  016605  000012                  MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
044710  005003                          CLR     R3              ;;CLEAR THE OUTPUT WORD
044712  006105                  1$:     ROL     R5              ;;ROTATE MSB INTO "C"
044714  000404                          BR      3$              ;;GO DO MSB
044716  006105                  2$:     ROL     R5              ;;FORM THIS DIGIT
044720  006105                          ROL     R5
044722  006105                          ROL     R5
044724  010503                          MOV     R5,R3
044726  006103                  3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
044730  105337  045032                  DECB    $OMODE          ;;TYPE THIS DIGIT?
044734  100016                          BPL     7$              ;;BR IF NO
044736  042703  177770                  BIC     #177770,R3      ;;GET RID OF JUNK
044742  001002                          BNE     4$              ;;TEST FOR 0
044744  005704                          TST     R4              ;;SUPPRESS THIS 0?
044746  001403                          BEQ     5$              ;;BR IF YES
044750  005204                  4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
044752  052703  000060                  BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
044756  052703  000040          5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
```

BINARY TO OCTAL (ASCII) AND TYPE

```
044762  110337  045026                  MOVB    R3,8$           ;;SAVE FOR TYPING
044766  104401  045026                  TYPE    ,8$             ;;GO TYPE THIS DIGIT
044772  105337  045030          7$:     DECB    $OCNT           ;;COUNT BY 1
044776  003347                  BGT     2$                      ;;BR IF MORE TO DO
045000  002402                  BLT     6$                      ;;BR IF DONE
045002  005204                  INC     R4                      ;;INSURE LAST DIGIT ISN'T A BLANK
045004  000744                  BR      2$                      ;;GO DO THE LAST DIGIT
045006  012605          6$:     MOV     (SP)+,R5                ;;RESTORE R5
045010  012604                  MOV     (SP)+,R4                ;;RESTORE R4
045012  012603                  MOV     (SP)+,R3                ;;RESTORE R3
045014  016666  000002  000004  MOV     2(SP),4(SP)             ;;SET THE STACK FOR RETURNING
045022  012616                  MOV     (SP)+,(SP)
045024  000002                  RTI                             ;;RETURN
045026     000          8$:     .BYTE   0                       ;;STORAGE FOR ASCII DIGIT
045027     000                  .BYTE   0                       ;;TERMINATOR FOR TYPE ROUTINE
045030     000          $OCNT:  .BYTE   0                       ;;OCTAL DIGIT COUNTER
045031     000          $OFILL: .BYTE   0                       ;;ZERO FILL SWITCH
045032  000000          $OMODE: .WORD   0                       ;;NUMBER OF DIGITS TO TYPE
```

```
 7220                                   .SBTTL  CONVERT BINARY TO DECIMAL AND TYPE ROUTINE
                                        ;;*****************************************************************
                                        ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 5-DIGIT
                                        ;*SIGNED DECIMAL (ASCII) NUMBER AND TYPE IT. DEPENDING ON WHETHER THE
                                        ;*NUMBER IS POSITIVE OR NEGATIVE A SPACE OR A MINUS SIGN WILL BE TYPED
                                        ;*BEFORE THE FIRST DIGIT OF THE NUMBER. LEADING ZEROS WILL ALWAYS BE
                                        ;*REPLACED WITH SPACES.
                                        ;*CALL:
                                        ;*      MOV     NUM,-(SP)       ;;PUT THE BINARY NUMBER ON THE STACK
                                        ;*      TYPDS                   ;;GO TO THE ROUTINE
 045034                                 $TYPDS:
 045034  010046                                 MOV     R0,-(SP)        ;;PUSH R0 ON STACK
 045036  010146                                 MOV     R1,-(SP)        ;;PUSH R1 ON STACK
 045040  010246                                 MOV     R2,-(SP)        ;;PUSH R2 ON STACK
 045042  010346                                 MOV     R3,-(SP)        ;;PUSH R3 ON STACK
 045044  010546                                 MOV     R5,-(SP)        ;;PUSH R5 ON STACK
 045046  012746  020200                        MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
 045052  016605  000020                        MOV     20(SP),R5       ;;GET THE INPUT NUMBER
 045056  100004                                BPL     1$              ;;BR IF INPUT IS POS.
 045060  005405                                NEG     R5              ;;MAKE THE BINARY NUMBER POS.
 045062  112766  000055  000001                MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
 045070  005000                         1$:    CLR     R0              ;;ZERO THE CONSTANTS INDEX
 045072  012703  045250                        MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
 045076  112723  000040                        MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
 045102  005002                         2$:    CLR     R2              ;;CLEAR THE BCD NUMBER
 045104  016001  045240                        MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
 045110  160105                         3$:    SUB     R1,R5           ;;FORM THIS BCD DIGIT
 045112  002402                                BLT     4$              ;;BR IF DONE
 045114  005202                                INC     R2              ;;INCREASE THE BCD DIGIT BY 1
 045116  000774                                BR      3$
 045120  060105                         4$:    ADD     R1,R5           ;;ADD BACK THE CONSTANT
 045122  005702                                TST     R2              ;;CHECK IF BCD DIGIT=0
 045124  001002                                BNE     5$              ;;FALL THROUGH IF 0
 045126  105716                                TSTB    (SP)            ;;STILL DOING LEADING 0'S?
 045130  100407                                BMI     7$              ;;BR IF YES
 045132  106316                         5$:    ASLB    (SP)            ;;MSD?
 045134  103003                                BCC     6$              ;;BR IF NO
 045136  116663  000001  177777                MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
 045144  052702  000060                 6$:    BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
 045150  052702  000040                 7$:    BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
 045154  110223                                MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
 045156  005720                                TST     (R0)+           ;;JUST INCREMENTING
 045160  020027  000010                        CMP     R0,#10          ;;CHECK THE TABLE INDEX
 045164  002746                                BLT     2$              ;;GO DO THE NEXT DIGIT
 045166  003002                                BGT     8$              ;;GO TO EXIT
 045170  010502                                MOV     R5,R2           ;;GET THE LSD
 045172  000764                                BR      6$              ;;GO CHANGE TO ASCII
 045174  105726                         8$:    TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
 045176  100003                                BPL     9$              ;;BR IF NO
 045200  116663  177777  177776                MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
 045206  105013                         9$:    CLRB    (R3)            ;;SET THE TERMINATOR
 045210  012605                                MOV     (SP)+,R5        ;;POP STACK INTO R5
 045212  012603                                MOV     (SP)+,R3        ;;POP STACK INTO R3
 045214  012602                                MOV     (SP)+,R2        ;;POP STACK INTO R2
 045216  012601                                MOV     (SP)+,R1        ;;POP STACK INTO R1
 045220  012600                                MOV     (SP)+,R0        ;;POP STACK INTO R0
 045222  104401  045250                        TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
```

```
045226  016666  000002  000004          MOV     2(SP),4(SP)     ;;ADJUST THE STACK
045234  012616                          MOV     (SP)+,(SP)
045236  000002                          RTI                     ;;RETURN TO USER
045240  023420                  $DTBL:  10000.
045242  001750                          1000.
045244  000144                          100.
045246  000012                          10.
045250                          $DBLK:  .BLKW   4
```

```
7222                                    .SBTTL  TTY INPUT ROUTINE
                                        ;;*****************************************************************
                                        .ENABL  LSB
                                        .DSABL  LSB
                                        ;;*****************************************************************
                                        ;*THIS ROUTINE WILL INPUT A SINGLE CHARACTER FROM THE TTY
                                        ;*CALL:
                                        ;*      RDCHR                   ;;INPUT A SINGLE CHARACTER FROM THE TTY
                                        ;*      RETURN HERE             ;;CHARACTER IS ON THE STACK
                                        ;*                              ;;WITH PARITY BIT STRIPPED OFF
                                        ;
045260  011646                  $RDCHR: MOV     (SP),-(SP)      ;;PUSH DOWN THE PC
045262  016666  000004  000002          MOV     4(SP),2(SP)     ;;SAVE THE PS
045270  105777  134602          1$:     TSTB    @$TKS           ;;WAIT FOR
045274  100375                          BPL     1$              ;;A CHARACTER
045276  117766  134576  000004          MOVB    @$TKB,4(SP)     ;;READ THE TTY
045304  042766  177600  000004          BIC     #^C<177>,4(SP)  ;;GET RID OF JUNK IF ANY
045312  026627  000004  000023          CMP     4(SP),#23       ;;IS IT A CONTROL-S?
045320  001013                          BNE     3$              ;;BRANCH IF NO
045322  105777  134550          2$:     TSTB    @$TKS           ;;WAIT FOR A CHARACTER
045326  100375                          BPL     2$              ;;LOOP UNTIL ITS THERE
045330  117746  134544                  MOVB    @$TKB,-(SP)     ;;GET CHARACTER
045334  042716  177600                  BIC     #^C177,(SP)     ;;MAKE IT 7-BIT ASCII
045340  022627  000021                  CMP     (SP)+,#21       ;;IS IT A CONTROL-Q?
045344  001366                          BNE     2$              ;;IF NOT DISCARD IT
045346  000750                          BR      1$              ;;YES, RESUME
045350  026627  000004  000021  3$:     CMP     4(SP),#$XON     ;;IS IT A RANDOM XON?                   ;RAN001
045356  001744                          BEQ     1$              ;;BRANCH IF YES                         ;RAN001
045360  026627  000004  000140          CMP     4(SP),#140      ;;IS IT UPPER CASE?
045366  002407                          BLT     4$              ;;BRANCH IF YES
045370  026627  000004  000175          CMP     4(SP),#175      ;;IS IT A SPECIAL CHAR?
045376  003003                          BGT     4$              ;;BRANCH IF YES
045400  042766  000040  000004          BIC     #40,4(SP)       ;;MAKE IT UPPER CASE
045406  000002                  4$:     RTI                     ;;GO BACK TO USER
                                        ;;*****************************************************************
                                        ;*THIS ROUTINE WILL INPUT A STRING FROM THE TTY
                                        ;*CALL:
                                        ;*      RDLIN                   ;;INPUT A STRING FROM THE TTY
                                        ;*      RETURN HERE             ;;ADDRESS OF FIRST CHARACTER WILL BE ON THE STACK
                                        ;*                              ;;TERMINATOR WILL BE A BYTE OF ALL 0'S
045410  010346                  $RDLIN: MOV     R3,-(SP)        ;;SAVE R3
045412  012703  045516          1$:     MOV     #$TTYIN,R3      ;;GET ADDRESS
045416  022703  045526          2$:     CMP     #$TTYIN+8.,R3   ;;BUFFER FULL?
045422  101405                          BLOS    4$              ;;BR IF YES
045424  104407                          RDCHR                   ;;GO READ ONE CHARACTER FROM THE TTY
045426  112613                          MOVB    (SP)+,(R3)      ;;GET CHARACTER
045430  122713  000177          10$:    CMPB    #177,(R3)       ;;IS IT A RUBOUT
045434  001003                          BNE     3$              ;;SKIP IF NOT
045436  104401  002116          4$:     TYPE    ,$QUES          ;;TYPE A '?'
045442  000763                          BR      1$              ;;CLEAR THE BUFFER AND LOOP
045444  111337  045514          3$:     MOVB    (R3),9$         ;;ECHO THE CHARACTER
045450  104401  045514                  TYPE    ,9$
045454  122723  000015                  CMPB    #15,(R3)+       ;;CHECK FOR RETURN
045460  001356                          BNE     2$              ;;LOOP IF NOT RETURN
045462  105063  177777                  CLRB    -1(R3)          ;;CLEAR RETURN (THE 15)
045466  104401  002120                  TYPE    ,$LF            ;;TYPE A LINE FEED
045472  012603                          MOV     (SP)+,R3        ;;RESTORE R3
```

```
045474  011646                          MOV     (SP),-(SP)      ;;ADJUST THE STACK AND PUT ADDRESS OF THE
045476  016666  000004  000002          MOV     4(SP),2(SP)     ;;      FIRST ASCII CHARACTER ON IT
045504  012766  045516  000004          MOV     #$TTYIN,4(SP)
045512  000002                          RTI                     ;;RETURN
045514     000                  9$:     .BYTE   0               ;;STORAGE FOR ASCII CHAR. TO TYPE
045515     000                          .BYTE   0               ;;TERMINATOR
045516                          $TTYIN: .BLKB   8.              ;;RESERVE 8 BYTES FOR TTY INPUT
045526     136     125     015  $CNTLU: .ASCIZ  /^U/<15><12>    ;;CONTROL 'U'
045533     136     107     015  $CNTLG: .ASCIZ  /^G/<15><12>    ;;CONTROL 'G'
045540     015     012     123  $MSWR:  .ASCIZ  <15><12>/SWR = /
045551     040     040     116  $MNEW:  .ASCIZ  /  NEW = /
```

```
 7224                                   .SBTTL  READ AN OCTAL NUMBER FROM THE TTY
                                        ;;*****************************************************************
                                        ;*THIS ROUTINE WILL READ AN OCTAL (ASCII) NUMBER FROM THE TTY AND
                                        ;*CHANGE IT TO BINARY.
                                        ;*CALL:
                                        ;*      RDOCT                   ;;READ AN OCTAL NUMBER
                                        ;*      RETURN HERE             ;;LOW ORDER BITS ARE ON TOP OF THE STACK
                                        ;*                              ;;HIGH ORDER BITS ARE IN $HIOCT
045562  011646                  $RDOCT: MOV     (SP),-(SP)              ;;PROVIDE SPACE FOR THE
045564  016666  000004  000002          MOV     4(SP),2(SP)             ;;INPUT NUMBER
045572  010046                          MOV     R0,-(SP)                ;;PUSH R0 ON STACK
045574  010146                          MOV     R1,-(SP)                ;;PUSH R1 ON STACK
045576  010246                          MOV     R2,-(SP)                ;;PUSH R2 ON STACK
045600  104410                  1$:     RDLIN                           ;;READ AN ASCIZ LINE
045602  012600                          MOV     (SP)+,R0                ;;GET ADDRESS OF 1ST CHARACTER
045604  005001                          CLR     R1                      ;;CLEAR DATA WORD
045606  005002                          CLR     R2
045610  112046                  2$:     MOVB    (R0)+,-(SP)             ;;PICKUP THIS CHARACTER
045612  001412                          BEQ     3$                      ;;IF ZERO GET OUT
045614  006301                          ASL     R1                      ;;*2
045616  006102                          ROL     R2
045620  006301                          ASL     R1                      ;;*4
045622  006102                          ROL     R2
045624  006301                          ASL     R1                      ;;*8
045626  006102                          ROL     R2
045630  042716  177770                  BIC     #^C7,(SP)               ;;STRIP THE ASCII JUNK
045634  062601                          ADD     (SP)+,R1                ;;ADD IN THIS DIGIT
045636  000764                          BR      2$                      ;;LOOP
045640  005726                  3$:     TST     (SP)+                   ;;CLEAN TERMINATOR FROM STACK
045642  010166  000012                  MOV     R1,12(SP)               ;;SAVE THE RESULT
045646  010237  045662                  MOV     R2,$HIOCT
045652  012602                          MOV     (SP)+,R2                ;;POP STACK INTO R2
045654  012601                          MOV     (SP)+,R1                ;;POP STACK INTO R1
045656  012600                          MOV     (SP)+,R0                ;;POP STACK INTO R0
045660  000002                          RTI                             ;;RETURN
045662  000000                  $HIOCT: .WORD   0                       ;;HIGH ORDER BITS GO HERE
```

```
7226                                    .SBTTL  READ A DECIMAL NUMBER FROM THE TTY
                                        ;;*****************************************************************
                                        ;*THIS ROUTINE WILL READ A DECIMAL (ASCII) NUMBER FROM THE TTY AND
                                        ;*CHANGE IT TO BINARY. IF TOO MANY CHARACTERS OR ANY ILLEGAL CHARACTERS
                                        ;*ARE READ A "?" FOLLOWED BY A CARRIAGE RETURN-LINE FEED WILL BE TYPED.
                                        ;*THE COMPLETE NUMBER MUST BE RETYPED. THE INPUT IS TERMINATED BY THE
                                        ;*USER TYPING A CARRIAGE RETURN. THE RANGE OF THE INPUT NUMBER IS
                                        ;*POSITIVE 32767 TO NEGATIVE 32768.
                                        ;*CALL:
                                        ;*      RDDEC                   ;;READ A DECIMAL NUMBER
                                        ;*      RETURN HERE             ;;NUMBER IS ON TOP OF THE STACK
                                        ;
045664  011646                 $RDDEC: MOV     (SP),-(SP)              ;;PROVIDE SPACE FOR
045666  016666  000004  000002          MOV     4(SP),2(SP)             ;;THE INPUT NUMBER
045674  010046                         MOV     R0,-(SP)                ;;PUSH R0 ON STACK
045676  010146                         MOV     R1,-(SP)                ;;PUSH R1 ON STACK
045700  010246                         MOV     R2,-(SP)                ;;PUSH R2 ON STACK
045702  104410                 1$:     RDLIN                           ;;READ AN ASCIZ LINE
045704  012600                         MOV     (SP)+,R0                ;;ADDRESS OF 1ST CHAR.
045706  010037  046032                 MOV     R0,6$                   ;;SAVE INCASE OF BAD INPUT
045712  005046                         CLR     -(SP)                   ;;CLEAR DATA WORD
045714  005002                         CLR     R2                      ;;SIGN SET POSITIVE
045716  122710  000055                 CMPB    #'-,(R0)                ;;SEE IF A MINUS SIGN WAS TYPED
045722  001001                         BNE     2$                      ;;BR IF NO MINUS SIGN
045724  112002                         MOVB    (R0)+,R2                ;;SAVE FOR LATER USE
045726  112001                 2$:     MOVB    (R0)+,R1                ;;PICKUP THIS CHARACTER
045730  001424                         BEQ     3$                      ;;GET OUT IF ZERO
045732  122701  000060                 CMPB    #'0,R1                  ;;MAKE SURE THIS CHARACTER
045736  003032                         BGT     5$                      ;;IS A DIGIT BETWEEN 0 & 9
045740  122701  000071                 CMPB    #'9,R1
045744  002427                         BLT     5$
045746  032716  170000                 BIT     #^C7777,(SP)            ;;DON'T LET NUMBER GET TO BIG
045752  001024                         BNE     5$                      ;;BR IF NUMBER WOULD OVERFLOW
045754  006316                         ASL     (SP)                    ;;*2
045756  011646                         MOV     (SP),-(SP)              ;;SAVE FOR LATER
045760  006316                         ASL     (SP)                    ;;*4
045762  006316                         ASL     (SP)                    ;;*8.
045764  062616                         ADD     (SP)+,(SP)              ;;*10.
045766  102416                         BVS     5$                      ;;OVERFLOW ISN'T ALLOWED
045770  162701  000060                 SUB     #'0,R1                  ;;STRIP AWAY THE ASCII JUNK
045774  060116                         ADD     R1,(SP)                 ;;ADD IN THIS DIGIT
045776  102412                         BVS     5$                      ;;OVERFLOW ISN'T ALLOWED
046000  000752                         BR      2$                      ;;LOOP
046002  005702                 3$:     TST     R2                      ;;CHECK IF NUMBER IS NEG
046004  001401                         BEQ     4$                      ;;BR IF NO
046006  005416                         NEG     (SP)                    ;;YES--NEGATE THE NUMBER
046010  012666  000012         4$:     MOV     (SP)+,12(SP)            ;;SAVE THE RESULT
046014  012602                         MOV     (SP)+,R2                ;;POP STACK INTO R2
046016  012601                         MOV     (SP)+,R1                ;;POP STACK INTO R1
046020  012600                         MOV     (SP)+,R0                ;;POP STACK INTO R0
046022  000002                         RTI                             ;;RETURN
046024  005726                 5$:     TST     (SP)+                   ;;CLEAN PARTIAL NUMBER FROM STACK
046026  105010                         CLRB    (R0)                    ;;SET A TERMINATOR
046030  104401                         TYPE                            ;;TYPE THE INPUT UP TO BAD CHAR.
046032  000000                 6$:     .WORD   0                       ;;POINTER GOES HERE
046034  104401  002116                 TYPE    ,$QUES                  ;;"?" "CR" &"LF"
046040  000720                         BR      1$                      ;;TRY AGAIN
```

```
7228                                    .SBTTL  BINARY TO ASCII AND TYPE ROUTINE
                                        ;;**********************************************************************
                                        ;*THIS ROUTINE IS USED TO CHANGE A 16-BIT BINARY NUMBER TO A 16-BIT
                                        ;*BINARY-ASCII NUMBER AND TYPE IT.
                                        ;*CALL:
                                        ;*      MOV     NUMBER,-(SP)    ;;NUMBER TO BE TYPED
                                        ;*      TYPBN                   ;;TYPE IT
046042  010146                  $TYPBN: MOV     R1,-(SP)        ;;SAVE R1 ON THE STACK
046044  016601  000006                  MOV     6(SP),R1        ;;GET THE INPUT NUMBER
046050  000261                          SEC                     ;;SET "C" SO CAN KEEP TRACK OF THE NUMBER OF BITS
046052  112737  000060  046114  1$:     MOVB    #'0,$BIN        ;;SET CHARACTER TO AN ASCII "0".
046060  006101                          ROL     R1              ;;GET THIS BIT
046062  001406                          BEQ     2$              ;;DONE?
046064  105537  046114                  ADCB    $BIN            ;;NO--SET THE CHARACTER EQUAL TO THIS BIT
046070  104401  046114                  TYPE    ,$BIN           ;;GO TYPE THIS BIT
046074  000241                          CLC                     ;;CLEAR "C" SO CAN KEEP TRACK OF BITS
046076  000765                          BR      1$              ;;GO DO THE NEXT BIT
046100  012601                  2$:     MOV     (SP)+,R1        ;;POP THE STACK INTO R1
046102  016666  000002  000004          MOV     2(SP),4(SP)     ;;ADJUST THE STACK
046110  012616                          MOV     (SP)+,(SP)
046112  000002                          RTI                     ;;RETURN TO USER
046114      000     000         $BIN:   .BYTE   0,0             ;;STORAGE FOR ASCII CHAR. AND TERMINATOR
```

```
7230                                    .SBTTL  TRAP DECODER
                                        ;;*****************************************************************
                                        ;*THIS ROUTINE WILL PICKUP THE LOWER BYTE OF THE "TRAP" INSTRUCTION
                                        ;*AND USE IT TO INDEX THROUGH THE TRAP TABLE FOR THE STARTING ADDRESS
                                        ;*OF THE DESIRED ROUTINE. THEN USING THE ADDRESS OBTAINED IT WILL
                                        ;*GO TO THAT ROUTINE.
046116  010046                          $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
046120  016600  000002                          MOV     2(SP),R0        ;;GET TRAP ADDRESS
046124  005740                          .       TST     -(R0)           ;;BACKUP BY 2
046126  111000                          .       MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
046130  006300                          .       ASL     R0              ;;POSITION FOR INDEXING
046132  016000  046152                  .       MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
046136  000200                          .       RTS     R0              ;;GO TO ROUTINE
                                        ;;THIS IS USE TO HANDLE THE "GETPRI" MACRO
046140  011646                          $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
046142  016666  000004  000002          .       MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
046150  000002                          .       RTI                     ;;RESTORE THE PSW
                                        .SBTTL  TRAP TABLE
                                        ;*THIS TABLE CONTAINS THE STARTING ADDRESSES OF THE ROUTINES CALLED
                                        ;*BY THE "TRAP" INSTRUCTION.
                                        ;       ROUTINE
                                        ;       -------
046152  046140                          $TRPAD: .WORD   $TRAP2
046154  044242                          .       $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
046156  044632                          .       $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
046160  044606                          .       $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
046162  044646                          .       $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
046164  045034                          .       $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)
046166  046042                          .       $TYPBN  ;;CALL=TYPBN    TRAP+6(104406)  TYPE BINARY (ASCII) NUMBER
046170  045260                          .       $RDCHR  ;;CALL=RDCHR    TRAP+7(104407)  TTY TYPEIN CHARACTER ROUTINE
046172  045410                          .       $RDLIN  ;;CALL=RDLIN    TRAP+10(104410) TTY TYPEIN STRING ROUTINE
046174  045562                          .       $RDOCT  ;;CALL=RDOCT    TRAP+11(104411) READ AN OCTAL NUMBER FROM TTY
046176  045664                          .       $RDDEC  ;;CALL=RDDEC    TRAP+12(104412) READ A DECIMAL NUMBER FROM TTY
7231    046200  046224                  .       $ERROR  ;;CALL=ERROR    TRAP+13(104413)
```

```
7233                                    .SBTTL  ERROR HANDLER ROUTINE
7234                                ;;**********************************************************************
7235 046202  000000                ERRPC:  .WORD   0
7236 046204  000000                SAVR0:  .WORD
7237 046206  000000                SAVR1:  .WORD
7238 046210  000000                SAVR2:  .WORD
7239 046212  000000                SAVR3:  .WORD
7240 046214  000000                SAVR4:  .WORD
7241 046216  000000                SAVR5:  .WORD
7242 046220  000000                CPSAVE: .WORD   0               ;LOCATION TO SAVE CPU ERROR REG CONTENTS
7243 046222  000000                IBSAVE: .WORD   0               ;FLAG TO INDICATE 2ND ERROR CALL DUE
```

```
7244
7245 046224  105037  046222          $ERROR: CLRB    IBSAVE          ;CLEAR THE ITEM BYTE SAVE LOCATION      ;DPM001
7246 046230  010037  046204          $EROVR: MOV     R0,SAVR0        ;SAVE R0 THRU R5
7247 046234  010137  046206                  MOV     R1,SAVR1
7248 046240  010237  046210                  MOV     R2,SAVR2
7249 046244  010337  046212                  MOV     R3,SAVR3
7250 046250  010437  046214                  MOV     R4,SAVR4
7251 046254  010537  046216                  MOV     R5,SAVR5
7252 046260  113777  002060  133606          MOVB    $TSTNM,@SWR     ;MOVE TEST NUMBER TO DISPLAY FOR ALL TO SEE
7253 046266  032777  020000  133600          BIT     #BIT13,@SWR     ;INHIBIT ERROR TYPEOUTS?
7254 046274  001160                          BNE     99$             ;YES
7255 046276  011601                          MOV     (SP),R1         ;R1 CONTAINS ADDRESS FOLLOWING ERRPC ADDRESS
7256 046300  012137  046202                  MOV     (R1)+,ERRPC     ;LOAD ERRPC ADDRESS AND POINT TO NEXT ARGUEMENT
7257 046304  022711  046220                  CMP     #CPSAVE,(R1)    ;SEE IF ORIG CALL WAS A PWR MN BIT ERR  ;DPM001
7258 046310  001431                          BEQ     1001$           ;BRANCH IF SO - NEXT TEST IS SUPERFLUOUS;DPM001
7259 046312  105737  046222                  TSTB    IBSAVE          ;SEE IF THIS IS THE 2ND ERROR CALL      ;DPM001
7260 046316  001024                          BNE     1000$           ;BRANCH IF SO                           ;DPM001
7261 046320  013737  177766  046220          MOV     177766,CPSAVE   ;MOVE CPU ERR REG TO CPSAVE FOR TEST    ;DPM001
7262 046326  032737  000001  046220          BIT     #BIT00,CPSAVE   ;SEE IF POWER MONITOR BIT IS SET        ;DPM001
7263 046334  001417                          BEQ     1001$           ;BRANCH IF OK                           ;DPM001
7264 046336  042737  000001  177766          BIC     #BIT00,177766   ;CLEAR THE BIT FOUND SET                 ;DPM001
7265 046344  012737  000177  001470          MOV     #177,$FATAL     ;LET APT KNOW THIS IS PWR MNTR BIT ERR  ;DPM001
7266 046352  105237  046222                  INCB    IBSAVE          ;MAKE IBSAVE NON-ZERO FOR DUAL CALL     ;DPM001
7267 046356  012701  046364                  MOV     #500$,R1        ;MOVE START LOCATIONS OF POINTERS TO R1 ;DPM001
7268 046362  000404                          BR      1001$           ;BRANCH OVER IBSAVE CLEARING            ;DPM001
7269 046364  046220  000000          500$:   .WORD   CPSAVE,0        ;1 DATA WORD TO PRINT                   ;DPM001
7270 046370  105037  046222          1000$:  CLRB    IBSAVE          ;CLEAR IBSAVE SO AFTER 2ND ERROR, EXIT  ;DPM001
7271 046374  117737  177602  001470  1001$:  MOVB    @ERRPC,$FATAL   ;LOAD $FATAL FOR APT                   ;DPM001
7272 046402  104401  046410                  TYPE    ,65$            ;;TYPE ASCIZ STRING
     046406  000411                          BR      64$             ;;GET OVER THE ASCIZ
                                  ;;65$:    .ASCIZ  <CRLF><CRLF>/TESTNO    ERRPC/
     046432                       64$:
7273 046432  005711          3$:     TST     (R1)            ;END OF ARGUEMENTS?
7274 046434  001412                  BEQ     25$             ;YES,GO PRINT DATA
7275 046436  012702  050420          MOV     #PRTABL,R2      ;ADDRESS OF START OF PRINT TABLE LIST
7276 046442  012703  047056          MOV     #PRTITL,R3      ;ADDRESS OF START OF TITLES
7277 046446  005723          2$:     TST     (R3)+           ;INDEX THRU TITLES
7278 046450  021122                  CMP     (R1),(R2)+      ;SEARCH PRINT TABLE LIST FOR TITLE
7279 046452  001375                  BNE     2$              ;NO; CHECK NEXT LOCATION IN LIST
7280 046454  004753                  JSR     PC,@-(R3)       ;FOUND IT; GO PRINT TITLE
7281 046456  005721                  TST     (R1)+           ;R1 POINTS TO NXT ARGUEMENT IN TEST CODE
7282 046460  000764                  BR      3$
7283 046462                  25$:
     046462  104401  046470          TYPE    ,67$            ;;TYPE ASCIZ STRING
     046466  000401                  BR      66$             ;;GET OVER THE ASCIZ
                                  ;;67$:    .ASCIZ  <CRLF>
     046472                       66$:
7284 046472  013746  001472          MOV     $TESTN,-(SP)    ;;SAVE $TESTN FOR TYPEOUT
     046476  104403                  TYPOS                   ;;GO TYPE--OCTAL ASCII
     046500     006                  .BYTE   6               ;;TYPE 6 DIGIT(S)
     046501     000                  .BYTE   0               ;;SUPPRESS LEADING ZEROS
7285 046502  104401  046510          TYPE    ,69$            ;;TYPE ASCIZ STRING
     046506  000402                  BR      68$             ;;GET OVER THE ASCIZ
                                  ;;69$:    .ASCIZ  /  /
     046514                       68$:
7286 046514  013746  046202          MOV     ERRPC,-(SP)     ;;SAVE ERRPC FOR TYPEOUT
     046520  104402                  TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
```

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                                        TYPE    ,$ENULL
                                        CMP     #500$+2,R1      ;SEE IF THIS IS SPECIAL PWR MNTR BIT ERR;DPM001
                                        BNE     29$             ;BRANCH IF NOT                          ;DPM001
                                        MOV     #500$,R1        ;RESET POINTER                          ;DPM001
                                        BR      3$              ;BRANCH OVER NON-PWR MNTR BIT ERR SETUP ;DPM001
                                29$:    MOV     (SP),R1         ;R1 CONTAINS ADDRESS FOLLOWING ERRORPC ADDRESS
                                        TST     (R1)+           ;POINT TO NEXT ARGUEMENT
                                13$:    TST     (R1)            ;END OF ARGUEMENTS?
                                        BEQ     99$             ;YES
                                        MOV     #PRTABL,R2      ;ADDRESS OF START OF PRINT TABLE LIST
                                        MOV     #PRDATA,R3      ;ADDRESS OF STERT OF PRINT DATA
                                12$:    TST     (R3)+           ;INDEX THRU DATA PRINTS
                                        CMP     (R1),(R2)+      ;SEARCH PRINT TABLE LIST FOR TITLE
                                        BNE     12$             ;NO; CHECK NEXT LOCATION IN LIST
                                        TYPE    ,71$            ;;TYPE ASCIZ STRING
                                        BR      70$             ;;GET OVER THE ASCIZ
                                ;;71$:  .ASCIZ  /       /
                                70$:
                                        JSR     PC,@-(R3)       ;
                                        TYPE    ,$ENULL
                                        TYPE    ,73$            ;;TYPE ASCIZ STRING
                                        BR      72$             ;;GET OVER THE ASCIZ
                                ;;73$:  .ASCIZ  /       /
                                72$:
                                        TST     (R1)+           ;R1 POINTS TO NEXT ARGUEMENT
                                        BR      13$
                                        ;INHIBIT ERROR TYPEOUT CODE

                                99$:    MOV (SP),R1             ;R1 CONTAINS ADDRESS FOLLOWING ERRPC ADDRESS
                                111$:   TST     (R1)            ;IS THIS THE END OF ARGUEMENT LIST?
                                        BEQ     112$            ;YES
                                        TST     (R1)+           ;POINT TO NEXT ARGUEMENT
                                        BR      111$
                                112$:   TST     (R1)+           ;R1 NOW CONTAINS RETURN ADDRESS
                                        CMP     #1000$,R1       ;SEE IF PWR MNTR BIT ERROR              ;DPM001
                                        BEQ     100$            ;BRANCH OVER NEXT INST IF SO            ;DPM001
                                        MOV     R1,(SP)         ;SETUP RETURN ADDRESS IN STACK

                                        ;HOE,LOE OPTION DETERMINATION

                                100$:   CMPB    #APTENV,$ENV    ;IS THIS APT?
                                        BEQ     52$             ;YES HALT ON ERROR
                                        CMP     42,46           ;IS THIS ACT11 QV OR AUTO ACCEPT
                                        BEQ     52$             ;YES HALT ON ERROR
                                        BIT     #BIT15,@SWR     ;IS HALT ON ERROR IMPLEMENTED?
                                        BEQ     51$             ;NO
                                52$:    MOV     #1,$MSGTY       ;SET $MSGTY FOR POSSIBLE APT USE
                                        HALT                    ;YES ,HALT PROCESSOR
                                51$:    BIT     #BIT09,@SWR     ;IS LOOP ON ERROR IMPLEMENTED?
                                        BNE     54$             ;YES
                                                                ;NO;INITIALIZE LOCATIONS WHERE
                                                                ;'JMP 1$' IS PLACED FOR LOOP ON ERROR
                                                                ;WITH NOP'S
                                        MOV     #240,@ADRJMP
                                        MOV     #240,@ADR1$
                                        BR      55$             ;CONTINUE WITH PRESENT TEST
                                54$:    MOV     #137,@ADRJMP    ;WRITE 'JMP' INSTRUCTION TO PROPER ADDRESS
```

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                                                                L 6
 7338 046756  013777  002130  133152          MOV     STRTLP,@ADR1$   ;WRITE '1$' LOCATION TO PROPER ADDRESS
 7339 046764  013737  002132  177752          MOV     ADRSYNC,CHR     ;LOAD ADDRESS LOCATION FOR SCOPE SYNC
 7340 046772  105037  177751                  CLRB    CMR+1
 7341 046776  013716  002130                  MOV     STRTLP,(SP)     ;SETUP LOCATION FOR LOOP ON ERROR IN STACK
 7342 047002  013700  046204          55$:    MOV     SAVR0,R0        ;RESTORE REGISTERS
 7343 047006  013701  046206                  MOV     SAVR1,R1
 7344 047012  013702  046210                  MOV     SAVR2,R2
 7345 047016  013703  046212                  MOV     SAVR3,R3
 7346 047022  013704  046214                  MOV     SAVR4,R4
 7347 047026  013705  046216                  MOV     SAVR5,R5
 7348 047032  032777  001000  133034          BIT     #BIT09,@SWR     ;CHECK TO SEE IF LOOP ON ERROR ENABLED  ;DPM001
 7349 047040  001005                          BNE     6$              ;BRANCH IF SO - DON'T CHECK FOR 2ND ERR ;DPM001
 7350 047042  005737  046222                  TST     IBSAVE          ;SEE IF THIS IS 1ST OF 2 ERRORS TO CALL ;DPM001
 7351 047046  001402                          BEQ     6$              ;BRANCH AROUND RETURN JUMP IF NOT       ;DPM001
 7352 047050  000137  046230                  JMP     $EROVR          ;JUMP BACK TO CALL 2ND ERROR            ;DPM001
 7353 047054  000002                  6$:     RTI                     ;RETURN
 7354
 7355 047056  047122  047156  047212  PRTITL: .WORD   1$,2$,3$,4$,5$,6$,7$,8$,9$,10$,11$,12$,13$,14$,15$,16$,17$,18$
 7356 047122                          1$:
      047122  104401  047130                  TYPE    ,65$             ;;TYPE ASCIZ STRING
      047126  000412                          BR      64$              ;;GET OVER THE ASCIZ
                                   ;;65$:     .ASCIZ  /    CA210(21:0)    /
      047154                       64$:
 7357 047154  000207                          RTS PC
 7358 047156                          2$:
      047156  104401  047164                  TYPE    ,67$             ;;TYPE ASCIZ STRING
      047162  000412                          BR      66$              ;;GET OVER THE ASCIZ
                                   ;;67$:     .ASCIZ  /    AMR210(21:0)   /
      047210                       66$:
 7359 047210  000207                          RTS PC
 7360 047212                          3$:
      047212  104401  047220                  TYPE    ,69$             ;;TYPE ASCIZ STRING
      047216  000412                          BR      68$              ;;GET OVER THE ASCIZ
                                   ;;69$:     .ASCIZ  /   CHR157(15:07)   /
      047244                       68$:
 7361 047244  000207                          RTS PC
 7362 047246                          4$:
      047246  10(     047254                  TYPE    ,71$             ;;TYPE ASCIZ STRING
      047252  00(                             BR      70$              ;;GET OVER THE ASCIZ
                                   ;;71$:     .ASCIZ  /   CA2113(21:13)   /
      047300                       70$:
 7363 047300  000207                          RTS PC
 7364 047302                          5$:
      047302  104401  047310                  TYPE    ,73$             ;;TYPE ASCIZ STRING
      047306  000412                          BR      72$              ;;GET OVER THE ASCIZ
                                   ;;73$:     .ASCIZ  /     CHR80(8:0)    /
      047334                       72$:
 7365 047334  000207                          RTS PC
 7366 047336                          6$:
      047336  104401  047344                  TYPE    ,75$             ;;TYPE ASCIZ STRING
      047342  000412                          BR      74$              ;;GET OVER THE ASCIZ
                                   ;;75$:     .ASCIZ  /   CDR150(15:0)   /
      047370                       74$:
 7367 047370  000207                          RTS PC
 7368 047372                          7$:
      047372  104401  047400                  TYPE    ,77$             ;;TYPE ASCIZ STRING
      047376  000412                          BR      76$              ;;GET OVER THE ASCIZ
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                                ;;77$:  .ASCIZ  /      EXDAT6      /
      047424                    76$:
 7369 047424  000207                   RTS PC
 7370 047426                    8$:
      047426  104401  047434            TYPE    ,79$              ;;TYPE ASCIZ STRING
      047432  000412                    BR      78$               ;;GET OVER THE ASCIZ
                                ;;79$:  .ASCIZ  /    CA121(12:1)   /
      047460                    78$:
 7371 047460  000207                   RTS PC
 7372 047462                    9$:
      047462  104401  047470            TYPE    ,81$              ;;TYPE ASCIZ STRING
      047466  000412                    BR      80$               ;;GET OVER THE ASCIZ
                                ;;81$:  .ASCIZ  /      EXDAT1      /
      047514                    80$:
 7373 047514  000207                   RTS PC
 7374 047516                    10$:
      047516  104401  047524            TYPE    ,83$              ;;TYPE ASCIZ STRING
      047522  000412                    BR      82$               ;;GET OVER THE ASCIZ
                                ;;83$:  .ASCIZ  /   CM1513(15:13)  /
      047550                    82$:
 7375 047550  000207                   RTS PC
 7376 047552                    11$:
      047552  104401  047560            TYPE    ,85$              ;;TYPE ASCIZ STRING
      047556  000412                    BR      84$               ;;GET OVER THE ASCIZ
                                ;;85$:  .ASCIZ  /    CNT121(12:1)   /
      047604                    84$:
 7377 047604  000207                   RTS PC
 7378 047606                    12$:
      047606  104401  047614            TYPE    ,87$              ;;TYPE ASCIZ STRING
      047612  000412                    BR      86$               ;;GET OVER THE ASCIZ
                                ;;87$:  .ASCIZ  /      FLTPAT      /
      047640                    86$:
 7379 047640  000207                   RTS PC
 7380 047642                    13$:
      047642  104401  047650            TYPE    ,89$              ;;TYPE ASCIZ STRING
      047646  000406                    BR      88$               ;;GET OVER THE ASCIZ
                                ;;89$:  .ASCIZ  /      RECDAT      /
      047664                    88$:
 7381 047664  000207                   RTS PC
 7382 047666                    14$:
      047666  104401  047674            TYPE    ,91$              ;;TYPE ASCIZ STRING
      047672  000411                    BR      90$               ;;GET OVER THE ASCIZ
                                ;;91$:  .ASCIZ  /      EXDAT3      /
      047716                    90$:
 7383 047716  000207                   RTS PC
 7384 047720                    15$:
      047720  104401  047726            TYPE    ,93$              ;;TYPE ASCIZ STRING
      047724  000407                    BR      92$               ;;GET OVER THE ASCIZ
                                ;;93$:  .ASCIZ  /       CHR50        /
      047744                    92$:
 7385 047744  000207                   RTS PC
 7386 047746                    16$:
      047746  104401  047754            TYPE    ,95$              ;;TYPE ASCIZ STRING
      047752  000411                    BR      94$               ;;GET OVER THE ASCIZ
                                ;;95$:  .ASCIZ  /      CMR119      /
      047776                    94$:
 7387 047776  000207                   RTS PC
```

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                                        17$:
7388 050000                                     TYPE    ,97$            ;;TYPE ASCIZ STRING
     050000  104401  050006                     BR      96$             ;;GET OVER THE ASCIZ
     050004  000411                     ;;97$:  .ASCIZ  /    FAILAD     /
     050030                             96$:
7389 050030  000207                             RTS PC
7390 050032                             18$:
     050032  104401  050040                     TYPE    ,99$            ;;TYPE ASCIZ STRING
     050036  000411                     BR      98$             ;;GET OVER THE ASCIZ
                                        ;;99$:  .ASCIZ  /     CPUERR    /
     050062                             98$:
7391 050062  000207                             RTS     PC
7392 050064  050130  050152  050174     PRDATA: .WORD   1$,2$,3$,4$,5$,6$,7$,8$,9$,10$,11$,12$,13$,14$,15$,16$,17$,18$
7393 050130                             1$:
     050130  013746  050464                     MOV     CA210,-(SP)     ;;SAVE CA210 FOR TYPEOUT
     050134  104403                     TYPOS                           ;;GO TYPE--OCTAL ASCII
     050136     003                     .BYTE   3                       ;;TYPE 3 DIGIT(S)
     050137     001                     .BYTE   1                       ;;TYPE LEADING ZEROS
7394 050140  013746  050466                     MOV     CA210+2,-(SP)   ;;SAVE CA210+2 FOR TYPEOUT
     050144  104403                     TYPOS                           ;;GO TYPE--OCTAL ASCII
     050146     005                     .BYTE   5                       ;;TYPE 5 DIGIT(S)
     050147     001                     .BYTE   1                       ;;TYPE LEADING ZEROS
7395 050150  000207                     RTS PC
7396 050152                             2$:
     050152  013746  050470                     MOV     AMR210,-(SP)    ;;SAVE AMR210 FOR TYPEOUT
     050156  104403                     TYPOS                           ;;GO TYPE--OCTAL ASCII
     050160     003                     .BYTE   3                       ;;TYPE 3 DIGIT(S)
     050161     001                     .BYTE   1                       ;;TYPE LEADING ZEROS
7397 050162  013746  05047?                     MOV     AMR210+2,-(SP)  ;;SAVE AMR210+2 FOR TYPEOUT
     050166  104403                     TYPOS                           ;;GO TYPE--OCTAL ASCII
     050170     005                     .BYTE   5                       ;;TYPE 5 DIGIT(S)
     050171     001                     .BYTE   1                       ;;TYPE LEADING ZEROS
7398 050172  000207                     RTS PC
7399 050174                     3$:
     050174  013746  050474                     MOV     CHR157,-(SP)    ;;SAVE CHR157 FOR TYPEOUT
     050200  104403                     TYPOS                           ;;GO TYPE--OCTAL ASCII
     050202     003                     .BYTE   3                       ;;TYPE 3 DIGIT(S)
     050203     001                     .BYTE   1                       ;;TYPE LEADING ZEROS
7400 050204  000207                     RTS PC
7401 050206                     4$:
     050206  013746  050476                     MOV     CA2113,-(SP)    ;;SAVE CA2113 FOR TYPEOUT
     050212  104403                     TYPOS                           ;;GO TYPE--OCTAL ASCII
     050214     003                     .BYTE   3                       ;;TYPE 3 DIGIT(S)
     050215     001                     .BYTE   1                       ;;TYPE LEADING ZEROS
7402 050216  000207                     RTS PC
7403 050220                     5$:
     050220  013746  050500                     MOV     CHR80,-(SP)     ;;SAVE CHR80 FOR TYPEOUT
     050224  104403                     TYPOS                           ;;GO TYPE--OCTAL ASCII
     050226     003                     .BYTE   3                       ;;TYPE 3 DIGIT(S)
     050227     001                     .BYTE   1                       ;;TYPE LEADING ZEROS
7404 050230  000207                     RTS PC
7405 050232                     6$:
     050232  013746  050502                     MOV     CDR150,-(SP)    ;;SAVE CDR150 FOR TYPEOUT
     050236  104402                     TYPOC                           ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
7406 050240  000207                     RTS PC
7407 050242                     7$:
     050242  013746  050504                     MOV     EXDAT6,-(SP)    ;;SAVE EXDAT6 FOR TYPEOUT
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                050246  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
7408            050250  000207                          RTS PC
7409            050252                          8$:
                050252  013746  050506                  MOV     CA121,-(SP)     ;;SAVE CA121 FOR TYPEOUT
                050256  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
                050260     004                          .BYTE   4               ;;TYPE 4 DIGIT(S)
                050261     001                          .BYTE   1               ;;TYPE LEADING ZEROS
7410            050262  000207                          RTS PC
7411            050264                          9$:
                050264  013746  050510                  MOV     EXDAT1,-(SP)    ;;SAVE EXDAT1 FOR TYPEOUT
                050270  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
                050272     001                          .BYTE   1               ;;TYPE 1 DIGIT(S)
                050273     001                          .BYTE   1               ;;TYPE LEADING ZEROS
7412            050274  000207                          RTS PC
7413            050276                          10$:
                050276  013746  050512                  MOV     CM1513,-(SP)    ;;SAVE CM1513 FOR TYPEOUT
                050302  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
                050304     001                          .BYTE   1               ;;TYPE 1 DIGIT(S)
                050305     001                          .BYTE   1               ;;TYPE LEADING ZEROS
7414            050306  000207                          RTS PC
7415            050310                          11$:
                050310  013746  050514                  MOV     CNT121,-(SP)    ;;SAVE CNT121 FOR TYPEOUT
                050314  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
                050316     004                          .BYTE   4               ;;TYPE 4 DIGIT(S)
                050317     001                          .BYTE   1               ;;TYPE LEADING ZEROS
7416            050320  000207                          RTS PC
7417            050322                          12$:
                050322  013746  050516                  MOV     FLTPAT,-(SP)    ;;SAVE FLTPAT FOR TYPEOUT
                050326  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
7418            050330  000207                          RTS PC
7419            050332                          13$:
                050332  013746  050520                  MOV     RECDAT,-(SP)    ;;SAVE RECDAT FOR TYPEOUT
                050336  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
7420            050340  000207                          RTS PC
7421            050342                          14$:
                050342  013746  050522                  MOV     EXDAT3,-(SP)    ;;SAVE EXDAT3 FOR TYPEOUT
                050346  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
                050350     003                          .BYTE   3               ;;TYPE 3 DIGIT(S)
                050351     001                          .BYTE   1               ;;TYPE LEADING ZEROS
7422            050352  000207                          RTS PC
7423            050354                          15$:
                050354  013746  050524                  MOV     CHR50,-(SP)     ;;SAVE CHR50 FOR TYPEOUT
                050360  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
                050362     002                          .BYTE   2               ;;TYPE 2 DIGIT(S)
                050363     001                          .BYTE   1               ;;TYPE LEADING ZEROS
7424            050364  000207                          RTS PC
7425            050366                          16$:
                050366  013746  050526                  MOV     CMR119,-(SP)    ;;SAVE CMR119 FOR TYPEOUT
                050372  104403                          TYPOS                   ;;GO TYPE--OCTAL ASCII
                050374     001                          .BYTE   1               ;;TYPE 1 DIGIT(S)
                050375     001                          .BYTE   1               ;;TYPE LEADING ZEROS
7426            050376  000207                          RTS PC
7427            050400                          17$:
                050400  013746  050530                  MOV     FAILAD,-(SP)    ;;SAVE FAILAD FOR TYPEOUT
                050404  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
7428            050406  000207                          RTS PC
7429            050410                          18$:
```

```
        050410  013746  046220                  MOV     CPSAVE,-(SP)    ;;SAVE CPSAVE FOR TYPEOUT
        050414  104402                          TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
   7430 050416  000207                          RTS     PC
```

```
7431
7432 050420  050464  050470  050474  PRTABL: .WORD   CA210,AMR210,CHR157,CA2113,CHR80,CDR150,EXDAT6,CA121,EXDAT1,CM1513
7433 050444  050514  050516  050520          .WORD   CNT121,FLTPAT,RECDAT,EXDAT3,CHR50,CMR119,FAILAD,CPSAVE
7434
7435 050464  000000  000000          CA210:  .WORD   0,0
7436 050470  000000  000000          AMR210: .WORD   0,0
7437 050474  000000                  CHR157: .WORD   0
7438 050476  000000                  CA2113: .WORD   0
7439 050500  000000                  CHR80:  .WORD   0
7440 050502  000000                  CDR150: .WORD   0
7441 050504  000000                  EXDAT6: .WORD   0
7442 050506  000000                  CA121:  .WORD   0
7443 050510  000000                  EXDAT1: .WORD   0
7444 050512  000000                  CM1513: .WORD   0
7445 050514  000000                  CNT121: .WORD   0
7446 050516  000000                  FLTPAT: .WORD   0
7447 050520  000000                  RECDAT: .WORD   0
7448 050522  000000                  EXDAT3: .WORD   0
7449 050524  000000                  CHR50:  .WORD   0
7450 050526  000000                  CMR119: .WORD   0
7451 050530  000000                  FAILAD: .WORD   0
7452                                 ;;*****************************************************************
7453         060000                          .=60000
7454 060000  000000          LOW1:           .WORD 0
7455         070000                          .=70000
7456 070000  000000          HIGH1:          .WORD 0
7457         000001                          .END
```

SYMBOL TABLE

```
ABASE = 000000        BEBA  = 170004        FAIL1  002070        SR3   = 172516        TST147 025620
ACDW1 = 000000        BECC  = 170002        FAIL2  002072        START 001000        TST15  003746
ACDW2 = 000000        BECR1 = 170006        FC     = 000400        STRTLP 002130       TST150 026140
ACPUOP= 000000        BECR2 = 170016        FLTPAT 050516        STRTST 002126       TST151 026534
ADDW0 = 000000        BEDA  = 170000        FMHI   = 000010        SWR    002074       TST152 027130
ADDW1 = 000000        BEGIN   002500        FMLO   = 000004        SWREG  000176       TST153 027272
ADDW10= 000000        BIT00 = 000001        HIGH1  070000        TDAR  = 000001       TST154 027464
ADDW11= 000000        BIT01 = 000002        HIT    = 000400        TPB   = 001000       TST155 027650
ADDW12= 000000        BIT02 = 000004        HODO   = 000002        TPE   = 000040       TST156 030030
ADDW13= 000000        BIT03 = 000010        HPB    = 004000        TSTCNT 002140       TST157 030156
ADDW14= 000000        BIT04 = 000020        HT     = 000011        TSTID = 000001       TST16  004016
ADDW15= 000000        BIT05 = 000040        IBSAVE 046222        TSTIMS 002142       TST160 030332
ADDW2 = 000000        BIT06 = 000100        KPAR0 = 172340        TST1   002576       TST161 030476
ADDW3 = 000000        BIT07 = 000200        KPAR1 = 172342        TST10  003364       TST162 030726
ADDW4 = 000000        BIT08 = 000400        KPAR2 = 172344        TST100 012730       TST163 031156
ADDW5 = 000000        BIT09 = 001000        KPAR3 = 172346        TST101 013154       TST164 031412
ADDW6 = 000000        BIT10 = 002000        KPAR4 = 172350        TST102 013336       TST165 031646
ADDW7 = 000000        BIT11 = 004000        KPAR5 = 172352        TST103 013654       TST166 032122
ADDW8 = 000000        BIT12 = 010000        KPAR6 = 172354        TST104 014432       TST167 032326
ADDW9 = 000000        BIT13 = 020000        KPAR7 = 172356        TST105 014644       TST17  004066
ADEVCT= 000000        BIT14 = 040000        KPDR0 = 172300        TST106 014776       TST170 032430
ADEVM = 000000        BIT15 = 100000        KPDR1 = 172302        TST107 015134       TST171 032630
ADRJMP  002134        CA121   050506        KPDR2 = 172304        TST11  003426       TST172 033166
ADRSYN  002132        CA210   050464        KPDR3 = 172306        TST110 015320       TST173 033524
ADR1$   002136        CA2113  050476        KPDR4 = 172310        TST111 015516       TST174 034014
AENV  = 000000        CCR   = 177746        KPDR5 = 172312        TST112 015716       TST175 034304
AENVM = 000000        CDR   = 177754        KPDR6 = 172314        TST113 016114       TST176 034662
AFATAL= 000000        CDR150  050502        KPDR7 = 172316        TST114 016314       TST177 035314
AM    = 000010        CHR   = 177752        LF     = 000012        TST115 016536       TST2   002672
AMADR1= 000000        CHRPAT  002066        LOOP    002062        TST116 016732       TST20  004136
AMADR2= 000000        CHR157  050474        LOW1    060000        TST117 017324       TST200 035746
AMADR3= 000000        CHR50   050524        LPB    = 002000        TST12  003506       TST201 036302
AMADR4= 000000        CHR80   050500        MAGPRE  007074        TST120 017420       TST202 036636
AMAMS1= 000000        CME   = 177744        OFF    = 001015        TST121 017476       TST203 037172
AMAMS2= 000000        CMPE  = 100000        PEA    = 000200        TST122 017604       TST204 037526
AMAMS3= 000000        CMR   = 177750        PEHI   = 000200        TST123 017712       TST205 037650
AMAMS4= 000000        CMRPAT  002064        PELO   = 000100        TST124 020130       TST206 037772
AMR210  050470        CMR119  050526        PRDATA  050064        TST125 020324       TST207 040114
AMSGAD= 000000        CM1   = 100000        PRTABL  050420        TST126 020542       TST21  004216
AMSGLG= 000000        CM1513  050512        PRTITL  047056        TST127 020744       TST210 040300
AMSGTY= 000000        CM2   = 040000        PSW    = 177776        TST13  003602       TST211 040464
AMTYP1= 000000        CM3   = 020000        RDCHR  = 104407        TST130 021212       TST212 040606
AMTYP2= 000000        CNT121  050514        RDDEC  = 104412        TST131 021470       TST213 040736
AMTYP3= 000000        CPSAVE  046220        RDLIN  = 104410        TST132 021746       TST214 041104
AMTYP4= 000000        CR    = 000015        RDOCT  = 104411        TST133 022164       TST215 041316
APASS = 000000        CRLF  = 000200        RECDAT  050520        TST134 022366       TST216 041434
APRIOR= 000000        DCPI  = 000001        RELCTH  002452        TST135 022604       TST217 041552
APTCSU= 000040        DISPRE  000174        RELCTL  002424        TST136 023006       TST22  004262
APTENV= 000001        EHA   = 000004        SAVR0   046204        TST137 023254       TST220 042034
APTSIZ= 000200        ENDPAS  044076        SAVR1   046206        TST14  003652       TST221 042202
APTSPO= 000100        ERROR = 104413        SAVR2   046210        TST140 023532       TST222 042732
ASWREG= 000000        ERRPC   046202        SAVR3   046212        TST141 024010       TST223 043326
ATESTN= 000000        ESA   = 000020        SAVR4   046214        TST142 024234       TST224 043472
AUNIT = 000000        EXDAT1  050510        SAVR5   046216        TST143 024444       TST225 043640
AUSWR = 000000        EXDAT3  050522        SCOPE  = 000004        TST144 024644       TST226 043774
AVECT1= 000000        EXDAT6  050504        SCPCND= 000004        TST145 025116       TST23  004332
AVECT2= 000000        FAILAD  050530        SR0    = 177572        TST146 025300       TST24  004402
```

SYMBOL TABLE

```
TST25   004452      TST7    003322      $CDW1   001546      $FILLC  002110      $RDOCT  045562
TST26   004522      TST70   010556      $CDW2   001550      $FILLS  002107      $RDSZ = 000010
TST27   004572      TST71   010724      $CHARC  044602      $HD   = 000003      $SCPSE  002144
TST3    002766      TST72   011254      $CNTLG  045533      $HIBTS  001452      $SETUP= 000000
TST30   004642      TST73   011442      $CNTLU  045526      $HIOCT  045662      $SWR  = 160000
TST31   004712      TST74   011634      $CPUOP  001514      $ICNT   044240      $SWREG  001510
TST32   004762      TST75   012044      $CRLF   002117      $LF     002120      $TESTN  001472
TST33   005032      TST76   012264      $DBLK   045250      $LFLG   002055      $TIMES  044236
TST34   005102      TST77   012510      $DDW0   001552      $MADR1  001520      $TKB    002100
TST35   005152      TYPBN = 104406      $DDW1   001554      $MADR2  001524      $TKS    002076
TST36   005222      TYPDS = 104405      $DDW10  001576      $MADR3  001530      $TN   = 000227
TST37   005272      TYPE  = 104401      $DDW11  001600      $MADR4  001534      $TPB    002104
TST4    003062      TYPOC = 104402      $DDW12  001602      $MAIL   001466      $TPFLG  002111
TST40   005342      TYPON = 104404      $DDW13  001604      $MAMS1  001516      $TPS    002102
TST41   005412      TYPOS = 104403      $DDW14  001606      $MAMS2  001522      $TRAP   046116
TST42   005462      UCB   = 001000      $DDW15  001610      $MAMS3  001526      $TRAP2  046140
TST43   005532      UMPR00= 170200      $DDW2   001556      $MAMS4  001532      $TRP  = 000014
TST44   005602      UMPR01= 170202      $DDW3   001560      $MBADR  001454      $TRPAD  046152
TST45   005652      UMPR02= 170204      $DDW4   001562      $MFLG   002054      $TSTM   001456
TST46   005722      UMPR03= 170206      $DDW5   001564      $MNEW   045551      $TSTNM  002060
TST47   005772      UMPR04= 170210      $DDW6   001566      $MSGAD  001502      $TTYIN  045516
TST5    003156      UMPR05= 170212      $DDW7   001570      $MSGLG  001504      $TYPBN  046042
TST50   006050      UMPR06= 170214      $DDW8   001572      $MSGTY  001466      $TYPDS  045034
TST51   006126      UMPR07= 170216      $DDW9   001574      $MSWR   045540      $TYPE   044242
TST52   006204      UMPR08= 170220      $DEVCT  001476      $MTYP1  001517      $TYPEC  044454
TST53   006262      UMPR09= 170222      $DEVM   001544      $MTYP2  001523      $TYPEX  044604
TST54   006340      VCIP  = 010000      $DOAGN  044232      $MTYP3  001527      $TYPOC  044632
TST55   006416      VLD   = 010000      $DTBL   045240      $MTYP4  001533      $TYPON  044646
TST56   006506      VSIU  = 020000      $ENDAD  044222      $NULL   002106      $TYPOS  044606
TST57   006604      WWPD  = 000100      $ENULL  002122      $NWTST= 000001      $UNIT   001500
TST6    003252      WWPT  = 002000      $ENV    001506      $OCNT   045030      $UNITM  001462
TST60   006654      $APTHD  001452      $ENVM   001507      $OMODE  045032      $USWR   001512
TST61   006724      $ATYC   001636      $EROVR  046230      $PASS   001474      $VECT1  001536
TST62   006774      $ATY1   001612      $ERROR  046224      $PASTM  001460      $VECT2  001540
TST63   007270      $ATY3   001620      $ERRPC  002422      $QUES   002116      $XOFF = 000023
TST64   007356      $ATY4   001630      $ETABL  001506      $RDCHR  045260      $XON  = 000021
TST65   007554      $BASE   001542      $ETEND  001612      $RDDEC  045664      $OFILL  045031
TST66   007734      $BELL   002112      $FATAL  001470      $RDLIN  045410      .$X   = 001452
TST67   010200      $BIN    046114      $FFLG   002056

. ABS.  070002      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  32328 WORDS  ( 127 PAGES)
DYNAMIC MEMORY:  20034 WORDS  ( 77 PAGES)
ELAPSED TIME:  00:06:57
CKKKAC.BIN,CKKKAC.SEQ/CR/NL:TOC/-SP=CKKKAC.MLB/ML,CKKKAC.P11
```

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
ABASE	= 000000	16-577	16-577							
ACDW1	= 000000	16-577	16-577							
ACDW2	= 000000	16-577	16-577							
ACPUOP	= 000000	16-577	16-577							
ADDW0	= 000000	16-577	16-577							
ADDW1	= 000000	16-577	16-577							
ADDW10	= 000000	16-577	16-577							
ADDW11	= 000000	16-577	16-577							
ADDW12	= 000000	16-577	16-577							
ADDW13	= 000000	16-577	16-577							
ADDW14	= 000000	16-577	16-577							
ADDW15	= 000000	16-577	16-577							
ADDW2	= 000000	16-577	16-577							
ADDW3	= 000000	16-577	16-577							
ADDW4	= 000000	16-577	16-577							
ADDW5	= 000000	16-577	16-577							
ADDW6	= 000000	16-577	16-577							
ADDW7	= 000000	16-577	16-577							
ADDW8	= 000000	16-577	16-577							
ADDW9	= 000000	16-577	16-577							
ADEVCT	= 000000	16-577	16-577							
ADEVM	= 000000	16-577	16-577							
ADRJMP	002134	#19-728	*19-771	19-773	19-775	182-7334	182-7337			
ADRSYN	002132	#19-727	*19-770	182-7339						
ADR1$	002136	#19-729	*19-773	*19-774	19-776	182-7335	182-7338			
AENV	= 000000	16-577	16-577							
AENVM	= 000000	16-577	16-577							
AFATAL	= 000000	16-577	16-577							
AM	= 000010	#18-698	68-1489	72-1560	73-1612	74-1644	75-1683	76-1735	77-1803	78-1852
		79-1903								
AMADR1	= 000000	16-577	16-577							
AMADR2	= 000000	16-577	16-577							
AMADR3	= 000000	16-577	16-577							
AMADR4	= 000000	16-577	16-577							
AMAMS1	= 000000	16-577	16-577							
AMAMS2	= 000000	16-577	16-577							
AMAMS3	= 000000	16-577	16-577							
AMAMS4	= 000000	16-577	16-577							
AMR210	050470	*74-1648	*74-1650	*74-1652	*74-1653	74-1661	*75-1687	*75-1688	*75-1689	75-1695
		*76-1737	*76-1739	76-1746	*77-1807	*77-1809	*77-1813	77-1820	*78-1854	*78-1856
		78-1865	*79-1907	*79-1910	*79-1913	*79-1915	79-1923	182-7396	182-7397	183-7432
		#183-7436								
AMSGAD	= 000000	16-577	16-577							
AMSGLG	= 000000	16-577	16-577							
AMSGTY	= 000000	16-577	16-577							
AMTYP1	= 000000	16-577	16-577							
AMTYP2	= 000000	16-577	16-577							
AMTYP3	= 000000	16-577	16-577							
AMTYP4	= 000000	16-577	16-577							
APASS	= 000000	16-577	16-577							
APRIOR	= 000000	16-577								
APTCSU	= 000040	#17-579	#18-680	173-7216						

```
SYMBOL CROSS REFERENCE
SYMBOL  VALUE          REFERENCES
APTENV  = 000001        17-579    #17-579    #18-678    173-7216   182-7321
APTSIZ  = 000200        14-563    #17-579    #18-677    89-2340    167-6911   168-6999
APTSPO  = 000100        17-579    #17-579    #18-679    173-7216
ASWREG  = 000000        16-577     16-577
ATESTN  = 000000        16-577     16-577
AUNIT   = 000000        16-577     16-577
AUSWR   = 000000        16-577     16-577
AVECT1  = 000000        16-577     16-577
AVECT2  = 000000        16-577     16-577
BEBA    = 170004       #18-672    *167-6945  *168-7019
BECC    = 170002       #18-671    *167-6947  *168-7020
BECR1   = 170006       #18-674     167-6918  *167-6950  167-6951   168-7006   *168-7023  168-7024
BECR2   = 170016       #18-675    *167-6949  *168-7022  168-7029
BEDA    = 170000       #18-673    *167-6948  *168-7021
BEGIN     002500        14-574    #21-802     172-7212
BIT00   = 000001       #18-625     19-736     19-738     31-978     31-981     49-1251    49-1253    63-1409    63-1413
                        64-1424    64-1428    182-7262   182-7264
BIT01   = 000002       #18-626     42-1146    42-1148    50-1261    50-1263    65-1439    65-1443    66-1454    66-1458
BIT02   = 000004       #18-627     32-994     32-998     33-1013    51-1271    51-1273    61-1376    61-1377    61-1379
                        62-1393    62-1394
BIT03   = 000010       #18-628     34-1026    34-1030    35-1045    52-1281    52-1283    67-1475    68-1493
BIT04   = 000020       #18-629     43-1161    43-1163    53-1291    53-1293
BIT05   = 000040       #18-630     44-1176    44-1178    69-1505    69-1507
BIT06   = 000100       #18-631     36-1058    36-1060    70-1515    70-1517
BIT07   = 000200       #18-632     37-1073    37-1075    38-1088    38-1092    71-1525    71-1527
BIT08   = 000400       #18-633     31-977     39-1105    39-1107    45-1191    45-1193    54-1301    54-1303    122-3888
BIT09   = 001000       #18-634     40-1121    55-1311    55-1313    182-7329   182-7348
BIT10   = 002000       #18-635     41-1132    41-1134    56-1321    56-1323    62-1396
BIT11   = 004000       #18-636     19-761     46-1206    46-1208    57-1331    57-1333    172-7192
BIT12   = 010000       #18-637     30-961     58-1341    58-1343
BIT13   = 020000       #18-638     59-1351    59-1353    182-7253
BIT14   = 040000       #18-639     19-750     47-1221    47-1223    60-1361    60-1363
BIT15   = 100000       #18-640     48-1236    48-1238    182-7325
CA121     050506       *90-2454   *90-2455    90-2460   *98-2749   *98-2750    98-2755   *105-3012  *105-3014   105-3019
                       *106-3057  *106-3059   106-3064  *107-3107  *107-3109   107-3114  *108-3151  *108-3153   108-3158
                       *109-3204  *109-3205   109-3212  *112-3372  *112-3374   112-3379  *113-3417  *113-3419   113-3424
                       *114-3468  *114-3470   114-3475  *115-3512  *115-3514   115-3519  *116-3565  *116-3566   116-3573
                       *124-4004  *124-4005   124-4019  *124-4029  *124-4030   124-4042  *125-4100  *125-4101   125-4116
                       *125-4126  *125-4127   125-4139  *126-4200  *126-4201   126-4216  *126-4231  *126-4232   126-4245
                       *127-4306  *127-4307   127-4322  *127-4337  *127-4338   127-4351  *135-4741  *135-4742   135-4750
                        135-4760   135-4768  *136-4813  *136-4814   136-4822   136-4832   136-4840  *137-4884  *137-4885
                        137-4893   137-4903   137-4911  *138-4955  *138-4956   138-4964   138-4974   138-4982  *139-5038
                       *139-5039   139-5047  *139-5057  *139-5058   139-5066  *140-5117  *140-5118   140-5126  *148-5686
                       *148-5687   148-5702  *148-5718  *148-5719   148-5730  *149-5811  *149-5812   149-5827  *149-5843
                       *149-5844   149-5856  *150-5921  *150-5922   150-5934  *150-5942  *150-5943   150-5951  *151-6016
                       *151-6017   151-6027  *151-6035  *151-6036   151-6044  *152-6109  *152-6110   152-6122  *152-6130
                       *152-6131   152-6140  *153-6207  *153-6208   153-6220  *153-6228  *153-6229   153-6237  *167-6968
                       *167-6970   167-6977   182-7409   183-7432  #183-7442
CA210     050464       *74-1646   *74-1647    74-1660   *75-1685   *75-1686    75-1694   *76-1740   *76-1741    76-1745
                       *77-1808   *77-1810   *77-1812    77-1819   *78-1857   *78-1858    78-1863   *79-1909   *79-1911
                       *79-1914   *79-1916    79-1921   *83-2070   *83-2071    83-2082   *84-2117   *84-2118    84-2128
                       *85-2162   *85-2163    85-2174   *86-2209   *86-2210    86-2220   *94-2586   *94-2587    94-2592
```

SYMBOL CROSS REFERENCE
SYMBOL VALUE

CA2113 050476

CCR = 177746

REFERENCES

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
		*153-6189	*153-6205	*153-6226	*153-6243	*154-6266	*154-6272	*154-6281	*155-6309	*155-6315
		*155-6325	*156-6353	*156-6359	*156-6368	*157-6393	*157-6398	*157-6401	*157-6406	*157-6415
		*157-6417	157-6418	*158-6444	*158-6449	*158-6452	*158-6458	*158-6469	*158-6471	158-6472
		*159-6501	*159-6507	*159-6515	*160-6543	*160-6549	*160-6553	*160-6557	*161-6591	*161-6599
		*161-6604	*161-6608	*161-6615	*162-6644	*162-6658	*162-6676	*163-6707	*163-6712	*163-6724
		*164-6754	*164-6759	*164-6772	*165-6787	*165-6803	*165-6836	*166-6863	*166-6869	*166-6881
		*167-6903	167-6904	*167-6906	167-6907	*167-6934	*167-6964	*168-6991	168-6992	*168-6994
		168-6995	*168-7015	168-7030	*168-7039	*169-7061	*169-7067	*169-7077	*170-7093	*170-7099
		*170-7109	*171-7140							
CDR	= 177754	#18-615	27-909	91-2485	92-2514	93-2544	94-2580	95-2618	96-2656	97-2694
		98-2742	119-3720	119-3726	124-3991	124-3996	125-4086	125-4091		
CDR150	050502	*91-2485	91-2489	91-2495	*92-2514	92-2518	92-2524	*93-2544	93-2548	93-2556
		*94-2580	94-2584	94-2593	*95-2618	95-2622	95-2631	*96-2656	96-2660	96-2669
		*97-2694	97-2698	97-2707	*119-3734	119-3741	*119-3746	119-3753	*124-4003	124-4017
		*124-4027	124-4040	*125-4098	125-4114	*125-4124	125-4137	182-7405	183-7432	#183-7440
CHR	= 177752	#18-614	26-888	*67-1469	*68-1486	*72-1541	*72-1544	*73-1606	*74-1629	*75-1676
		*76-1719	*77-1779	*78-1840	*79-1889	*80-1937	80-1949	*81-1972	81-1984	*82-2009
		82-2021	*83-2049	83-2063	*84-2096	84-2110	*85-2141	85-2155	*86-2188	86-2202
		87-2244	88-2294	89-2374	90-2447	*105-2988	*107-3083	*112-3348	*114-3443	*120-3764
		120-3780	121-3825	*126-4163	*126-4175	126-4182	126-4185	*127-4269	*127-4281	127-4288
		127-4291	*132-4587	*133-4631	*134-4674	*135-4719	*136-4790	*137-4862	*138-4933	*148-5631
		*148-5650	*149-5755	*149-5774	169-7075	170-7107	*182-7339			
CHRPAT	002066	#18-588	*74-1628	74-1629	74-1648	74-1650	*74-1663	*77-1774	77-1779	77-1807
		77-1808	*77-1827	*79-1878	79-1889	*79-1928				
CHR157	050474	*80-1949	*80-1953	80-1954	*80-1957	*80-1958	80-1965	*81-1984	*81-1988	81-1989
		*81-1992	*81-1993	81-2000	*82-2021	*82-2026	*82-2027	82-2030	82-2037	*83-2063
		*83-2067	83-2068	*83-2073	*83-2074	83-2081	*84-2110	*84-2114	84-2115	*84-2120
		*84-2121	84-2129	*85-2155	*85-2159	85-2160	*85-2165	*85-2166	85-2173	*86-2202
		*86-2206	86-2207	*86-2212	*86-2213	86-2221	*87-2244	*87-2248	87-2249	*87-2252
		*87-2253	87-2260	*88-2294	*88-2300	88-2301	*88-2307	*88-2309	88-2318	*89-2374
		*89-2381	89-2382	*89-2388	*89-2390	89-2399	*120-3780	*120-3784	120-3785	*120-3788
		*120-3789	120-3801	*121-3825	*121-3829	121-3830	*121-3833	*121-3834	121-3843	*126-4193
		*126-4196	*126-4197	126-4214	*126-4225	*126-4227	*126-4228	126-4244	*127-4299	*127-4302
		*127-4303	127-4320	*127-4331	*127-4333	*127-4334	127-4350	182-7399	183-7432	#183-7437
CHR50	050524	*169-7082	169-7086	*170-7114	170-7118	182-7423	183-7433	#183-7449		
CHR80	050500	*82-2007	82-2009	82-2030	82-2038	*82-2041	82-2042	182-7403	183-7432	#183-7439
CME	= 177744	#18-611	*19-749	23-823	*28-931	28-933	*49-1251	49-1253	*50-1261	50-1263
		*51-1271	51-1273	*52-1281	52-1283	*53-1291	53-1293	*54-1301	54-1303	*55-1311
		55-1313	*56-1321	56-1323	*57-1331	57-1333	*58-1341	58-1343	*59-1351	59-1353
		*60-1361	60-1363	*141-5146	141-5147	*142-5182	142-5190	*143-5246	143-5252	143-5256
		*143-5258	143-5259	*144-5347	144-5354	144-5358	*144-5361	144-5362	*145-5432	*146-5489
		*147-5555	147-5575	*147-5576	147-5577	*157-6407	*158-6459			
CMPE	= 100000	#18-713	147-5587	147-5594						
CMR	= 177750	#18-613	25-867	*63-1409	63-1410	*63-1412	*64-1424	64-1425	*64-1427	*65-1439
		65-1440	*65-1442	*66-1454	66-1455	*66-1457	*67-1470	*67-1471	67-1472	*67-1474
		*68-1487	*68-1488	*68-1489	68-1490	*68-1492	*69-1505	69-1507	*70-1515	70-1517
		*71-1525	71-1527	*72-1542	*72-1543	*72-1545	72-1558	*73-1607	*73-1608	73-1612
		*74-1630	*74-1631	74-1642	*75-1675	*75-1677	75-1681	*76-1720	*76-1721	76-1731
		*77-1778	*77-1782	77-1799	*78-1841	*78-1842	78-1852	*79-1888	*79-1892	79-1903
		*80-1938	*80-1951	*81-1973	*81-1986	*82-2011	*82-2023	*83-2053	*83-2065	*84-2100
		*84-2112	*85-2145	*85-2157	*86-2192	*86-2204	*87-2234	*87-2246	*88-2279	*88-2299
		*89-2363	*89-2380	*90-2435	*90-2449	*91-2475	*91-2487	*92-2504	*92-2516	*93-2534

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
		*93-2546	*94-2573	*94-2582	*95-2611	*95-2620	*96-2649	*96-2658	*97-2687	*97-2696
		*98-2729	*98-2744	*99-2773	99-2784	*99-2786	*100-2835	100-2852	*100-2857	*100-2889
		*105-2990	*105-2994	105-3006	*105-3008	*106-3041	106-3050	*106-3052	*107-3085	*107-3089
		107-3101	*107-3103	*108-3136	108-3145	*108-3147	*109-3180	*109-3184	*109-3189	109-3197
		*109-3199	*110-3235	110-3257	*110-3260	*111-3293	111-3315	*111-3318	*112-3350	*112-3354
		112-3366	*112-3368	*113-3401	113-3410	*113-3412	*114-3445	*114-3449	114-3461	*114-3463
		*115-3497	115-3506	*115-3508	*116-3541	*116-3545	*116-3550	116-3558	*116-3560	*117-3596
		117-3618	*117-3621	*118-3654	118-3676	*118-3679	*119-3708	*119-3728	*120-3765	*120-3772
		*120-3783	*121-3809	*121-3827	*122-3866	122-3879	122-3883	*122-3886	*123-3933	123-3944
		*123-3947	*124-3978	*124-4001	*124-4025	*124-4049	*125-4073	*125-4096	*125-4122	*125-4146
		*126-4166	*126-4191	*126-4223	*126-4252	*127-4272	*127-4297	*127-4329	*127-4358	*128-4377
		128-4387	*128-4389	*129-4426	129-4438	*129-4440	*130-4484	130-4494	*130-4496	*131-4534
		131-4546	*131-4549	*132-4588	132-4600	*132-4602	*133-4633	133-4645	*133-4647	*134-4675
		134-4688	*134-4691	*135-4726	135-4737	*135-4739	*136-4797	136-4809	*136-4811	*137-4869
		137-4880	*137-4882	*138-4940	138-4951	*138-4953	*139-5015	139-5030	*139-5032	*140-5095
		140-5110	*140-5112	*141-5141	*141-5149	*142-5174	*142-5193	*143-5234	*143-5262	*144-5334
		*144-5365	*145-5420	*145-5447	*146-5476	*146-5503	*147-5541	*147-5579	*148-5638	*148-5652
		148-5660	*148-5661	148-5671	*148-5677	*148-5709	*148-5737	*149-5762	*149-5776	149-5784
		*149-5785	149-5796	*149-5802	*149-5834	*149-5863	*150-5888	150-5912	150-5914	*150-5920
		*150-5941	*150-5958	*151-5983	151-6006	151-6009	*151-6015	*151-6034	*151-6051	*152-6076
		152-6099	152-6102	*152-6108	*152-6129	*152-6147	*153-6172	153-6197	153-6200	*153-6206
		*153-6227	*153-6244	*154-6268	154-6279	*155-6311	155-6323	*156-6355	156-6366	*157-6395
		157-6414	*158-6446	158-6468	*159-6503	159-6513	*160-6545	160-6556	*161-6595	161-6613
		*162-6654	162-6669	162-6671	*163-6708	163-6722	*164-6755	164-6770	*165-6798	*165-6819
		*165-6835	*167-6935	*167-6942	*167-6953	167-6962	*167-6965	*169-7064	*169-7078	*170-7096
		*170-7110	*182-7340							
CMRPAT	002064	#18-587	*75-1674	75-1675	75-1688	*75-1697	75-1698	*77-1773	77-1778	*77-1826
		*79-1877	79-1888	*79-1927						
CMR119	050526	*148-5679	*148-5682	*148-5683	148-5700	*148-5711	*148-5714	*148-5715	148-5728	*149-5804
		*149-5807	*149-5808	149-5825	*149-5836	*149-5839	*149-5840	149-5854	182-7425	183-7433
		#183-7450								
CM1	= 100000	#18-707								
CM1513	050512	*99-2784	*99-2788	99-2789	*99-2793	*99-2794	99-2802	*100-2852	*100-2859	*100-2860
		100-2863	100-2879	182-7413	183-7432	#183-7444				
CM2	= 040000	#18-706								
CM3	= 020000	#18-705								
CNT121	050514	*110-3262	*110-3264	110-3271	*111-3320	*111-3322	111-3329	*117-3623	*117-3625	117-3632
		*118-3681	*118-3683	118-3690	182-7415	183-7433	#183-7445			
CPSAVE	046220	*19-735	19-736	19-743	#181-7242	182-7257	*182-7261	182-7262	182-7269	182-7429
		183-7433								
CR	= 000015	173-7216	173-7216							
CRLF	= 000200	14-553	14-554	14-555	14-556	14-572	89-2416	89-2417	167-6930	167-6930
		167-6932	167-6932	172-7202	173-7216	173-7216	182-7272	182-7272	182-7283	
DCPI	= 000001	#18-683	145-5433							
DISPRE	000174	#13-518								
EHA	= 000004	#18-697								
ENDPAS	044076	#172-7190								
ERROR	= 104413	19-741	23-831	24-853	25-875	26-896	27-917	28-935	29-951	30-964
		31-983	32-1000	33-1015	34-1032	35-1047	36-1062	37-1077	38-1094	40-1123
		41-1136	42-1150	43-1165	44-1180	45-1195	46-1210	47-1225	48-1240	49-1255
		50-1265	51-1275	52-1285	53-1295	54-1305	55-1315	56-1325	57-1335	58-1345
		59-1355	60-1365	61-1381	62-1398	63-1415	64-1430	65-1445	66-1460	67-1477

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
		68-1495	69-1509	70-1519	71-1529	72-1562	73-1614	74-1656	75-1690	76-1742
		77-1816	78-1859	79-1919	80-1961	81-1996	82-2032	83-2077	84-2124	85-2169
		86-2216	87-2256	88-2313	89-2394	90-2456	91-2491	92-2520	93-2551	94-2588
		95-2626	96-2664	97-2702	98-2751	99-2797	100-2873	101-2910	102-2927	103-2950
		104-2972	105-3015	106-3060	107-3110	108-3154	109-3206	110-3265	111-3323	112-3375
		113-3420	114-3471	115-3515	116-3567	117-3626	118-3684	119-3735	119-3747	120-3793
		121-3838	122-3892	122-3900	122-3909	122-3917	123-3950	124-4006	124-4031	125-4102
		125-4128	126-4202	126-4233	127-4308	127-4339	128-4393	128-4401	129-4444	129-4454
		130-4500	130-4510	131-4556	131-4564	132-4606	133-4651	134-4698	135-4745	135-4755
		135-4764	136-4817	136-4827	136-4836	137-4888	137-4898	137-4907	138-4959	138-4969
		138-4978	139-5040	139-5059	140-5119	141-5153	142-5199	143-5273	143-5284	143-5295
		144-5376	144-5387	144-5398	145-5457	146-5513	147-5589	147-5596	147-5603	147-5610
		148-5688	148-5720	149-5813	149-5845	150-5923	150-5944	151-6018	151-6037	152-6111
		152-6132	153-6209	153-6230	154-6284	155-6328	156-6371	157-6422	158-6476	159-6518
		160-6561	161-6618	162-6681	163-6727	164-6775	165-6842	165-6852	166-6886	167-6971
		168-7042	168-7051	169-7083	170-7115	171-7144	172-7182	#180-7231		
ERRPC	046202	#181-7235	*182-7256	182-7271	182-7286					
ESA	= 000020	#18-699								
EXDAT1	050510	*99-2791	99-2801	*100-2872	100-2878	*148-5678	148-5699	*148-5710	148-5727	*149-5803
		149-5824	*149-5835	149-5853	182-7411	183-7432	#183-7443			
EXDAT3	050522	*120-3792	120-3800	*121-3837	121-3842	*126-4192	126-4213	*126-4224	126-4241	*127-4298
		127-4319	*127-4330	127-4347	182-7421	183-7433	#183-7448			
EXDAT6	050504	*93-2550	93-2555	*119-3733	119-3740	*119-3745	119-3752	*124-4002	124-4016	*124-4026
		124-4039	*125-4097	125-4113	*125-4123	125-4136	*142-5197	142-5202	*143-5271	143-5277
		*143-5282	143-5288	*143-5293	143-5299	*144-5374	144-5380	*144-5385	144-5391	*144-5396
		144-5402	*166-6885	166-6891	*171-7142	171-7146	182-7407	183-7432	#183-7441	
FAILAD	050530	*171-7141	171-7145	182-7427	183-7433	#183-7451				
FAIL1	002070	#18-589	*101-2900	*101-2904	101-2908	*145-5423	*145-5441	145-5455	*146-5480	*146-5500
		146-5511	*147-5545	*147-5570	147-5608	*165-6792	*165-6831	165-6840		
FAIL2	002072	#18-590	*165-6793	*165-6833	165-6849					
FC	= 000400	#18-688	101-2901	102-2921	103-2940	103-2943	104-2962	104-2965	105-2985	106-3035
		107-3080	108-3130	109-3172	110-3231	110-3245	110-3249	111-3289	111-3303	111-3307
		112-3345	113-3395	114-3440	115-3491	116-3533	117-3592	117-3606	117-3610	118-3650
		118-3664	118-3668	122-3862	123-3927	131-4550	134-4692	142-5170	143-5230	143-5264
		144-5330	144-5367	145-5414	145-5451	146-5470	146-5507	147-5534	147-5583	150-5882
		151-5977	152-6070	153-6166	157-6417	158-6471	167-6906	168-6994		
FLTPAT	050516	*76-1709	76-1719	76-1722	76-1737	76-1740	*76-1748	76-1749	*77-1765	77-1777
		77-1809	77-1810	*77-1822	77-1823	*89-2350	89-2360	*89-2403	*90-2428	90-2431
		90-2432	90-2454	*90-2465	90-2466	*93-2532	93-2533	93-2548	93-2550	*93-2558
		*98-2722	98-2725	98-2726	98-2749	*98-2760	98-2761	*109-3175	109-3178	109-3179
		109-3204	*109-3217	109-3218	*116-3536	116-3539	116-3540	116-3565	*116-3578	116-3579
		*129-4424	129-4425	129-4449	129-4459	*129-4462	129-4463	*130-4482	130-4483	130-4505
		130-4515	*130-4518	*133-4630	133-4631	133-4656	*133-4659	133-4660	*139-5008	139-5011
		139-5012	139-5038	139-5057	*139-5072	139-5073	*140-5090	140-5093	140-5094	140-5117
		*140-5132	140-5133	*166-6866	166-6867	166-6882	166-6885	*166-6895	182-7417	183-7433
		#183-7446								
FMHI	= 000010	#18-685	35-1043							
FMLO	= 000004	#18-684	33-1011	145-5433	146-5490	147-5556	157-6406	158-6458		
GNS	= ******	13-518	13-518	14-553	14-554	14-555	14-556	14-572	89-2416	89-2417
		167-6930	167-6931	167-6932	172-7202	180-7230	180-7230	180-7230	180-7230	180-7230
		180-7230	180-7230	180-7230	180-7230	180-7230	180-7230	180-7230	180-7230	180-7230
		180-7230	180-7230	180-7230	180-7230	180-7230	180-7230	180-7231	180-7231	182-7272

SYMBOL CROSS REFERENCE

SYMBOL		VALUE	REFERENCES								
			182-7283	182-7285	182-7301	182-7304	182-7356	182-7358	182-7360	182-7362	182-7364
			182-7366	182-7368	182-7370	182-7372	182-7374	182-7376	182-7378	182-7380	182-7382
			182-7384	182-7386	182-7388	182-7390					
HIGH1		070000	20-794	#183-7456							
HIT	=	000400	#18-700	154-6282	155-6326	156-6369	157-6420	158-6474	159-6516	160-6559	161-6616
			162-6679	163-6725	164-6773						
HODO	=	000002	#18-696	80-1938	81-1973	82-2011	83-2053	84-2100	85-2145	86-2192	87-2234
			88-2279	89-2363	90-2435	91-2475	92-2504	93-2534	94-2573	95-2611	96-2649
			97-2687	98-2729	99-2773	100-2835	105-2994	106-3041	107-3089	108-3136	109-3180
			110-3235	111-3293	112-3354	113-3401	114-3449	115-3497	116-3541	117-3596	118-3654
			119-3708	120-3765	121-3809	122-3866	123-3933	124-3978	125-4073	126-4166	127-4272
			128-4377	129-4426	130-4484	131-4534	132-4588	133-4633	134-4675	135-4726	136-4797
			137-4869	138-4940	139-5015	140-5095	141-5141	142-5174	143-5234	144-5334	145-5420
			146-5476	147-5541	148-5638	149-5762	150-5888	151-5983	152-6076	153-6172	154-6268
			155-6311	156-6355	157-6395	158-6446	159-6503	160-6545	161-6595	162-6654	163-6708
			164-6755	165-6798	165-6819	167-6935	167-6942	167-6953	169-7064	170-7096	
HPB	=	004000	#18-703	128-4391	129-4442	130-4498	131-4554	135-4743	136-4815	137-4886	138-4957
			139-5034	139-5053							
HT	=	000011	173-7216	173-7216							
IBSAVE		046222	#181-7243	*182-7245	182-7259	*182-7266	*182-7270	182-7350			
KPAR0	=	172340	#18-651	*72-1582							
KPAR1	=	172342	#18-652	*72-1583							
KPAR2	=	172344	#18-653	*72-1584							
KPAR3	=	172346	#18-654	*72-1585							
KPAR4	=	172350	#18-655	*76-1712	*77-1762	*79-1879	79-1910	79-1911	*79-1925	*88-2271	88-2301
			88-2305	*88-2323	*89-2348	89-2382	89-2386	*89-2402	*100-2825	100-2866	*100-2881
			*162-6647								
KPAR5	=	172352	#18-656								
KPAR6	=	172354	#18-657								
KPAR7	=	172356	#18-658	*72-1586							
KPDR0	=	172300	#18-643	*72-1574							
KPDR1	=	172302	#18-644	*72-1575							
KPDR2	=	172304	#18-645	*72-1576							
KPDR3	=	172306	#18-646	*72-1577							
KPDR4	=	172310	#18-647	*72-1578							
KPDR5	=	172312	#18-648	*72-1579							
KPDR6	=	172314	#18-649	*72-1580							
KPDR7	=	172316	#18-650	*72-1581							
LF	=	000012	173-7216	173-7216							
LOOP		002062	#18-586	*21-813	*21-814	*74-1651	*74-1654	*77-1811	*77-1814	*79-1912	*79-1917
			*80-1956	*80-1959	*81-1991	*81-1994	*82-2025	*82-2028	*83-2072	*83-2075	*84-2119
			*84-2122	*85-2164	*85-2167	*86-2211	*86-2214	*87-2251	*87-2254	*88-2306	*88-2311
			*89-2387	*89-2392	*99-2792	*99-2795	*100-2858	*100-2861	*100-2867	*100-2870	*120-3787
			*120-3790	*121-3832	*121-3835	*126-4195	*126-4198	*126-4226	*126-4229	*127-4301	*127-4304
			*127-4332	*127-4335	*148-5681	*148-5684	*148-5713	*148-5716	*149-5806	*149-5809	*149-5838
			*149-5841	*168-7026	*168-7027						
LOW1		060000	20-786	#183-7454							
LPB	=	002000	#18-702	128-4399	129-4452	130-4508	131-4562	135-4753	136-4825	137-4896	138-4967
MAGPRE		007074	#72-1574								
OFF	=	001015	14-547	#18-717	21-805	31-977	32-993	32-997	34-1025	34-1029	38-1091
			74-1627	75-1673	76-1706	77-1761	78-1838	79-1876	80-1936	80-1952	81-1971
			81-1987	82-2006	82-2024	83-2048	83-2066	84-2095	84-2113	85-2140	85-2158

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES								
		86-2187	86-2205	87-2233	87-2247	88-2270	88-2298	89-2339	89-2379	90-2427
		90-2450	91-2473	91-2488	92-2502	92-2517	93-2531	93-2547	94-2566	94-2583
		95-2604	95-2621	96-2642	96-2659	97-2680	97-2697	98-2717	98-2745	99-2772
		99-2787	100-2812	100-2856	100-2890	105-2982	105-3009	106-3053	107-3077	107-3104
		108-3127	108-3148	109-3169	109-3200	110-3226	110-3261	111-3284	111-3319	112-3342
		112-3369	113-3392	113-3413	114-3437	114-3464	115-3488	115-3509	116-3530	116-3561
		117-3587	117-3622	118-3645	118-3680	119-3703	119-3729	120-3763	120-3781	121-3808
		121-3828	122-3859	122-3884	123-3924	123-3945	124-3970	124-4000	124-4024	124-4048
		125-4065	125-4095	125-4121	125-4145	126-4162	126-4190	126-4222	126-4251	127-4268
		127-4296	127-4328	127-4357	128-4375	128-4390	129-4423	129-4441	130-4481	130-4497
		131-4532	131-4548	132-4586	132-4603	133-4629	133-4648	134-4673	134-4690	135-4718
		135-4740	136-4789	136-4812	137-4861	137-4883	138-4932	138-4954	139-5002	139-5033
		140-5089	140-5113	141-5140	142-5169	142-5192	143-5229	143-5261	144-5329	144-5364
		145-5413	145-5442	145-5444	146-5469	146-5497	146-5499	147-5533	147-5571	147-5573
		148-5629	148-5676	148-5708	148-5736	149-5753	149-5801	149-5833	149-5862	150-5879
		150-5919	150-5940	150-5957	151-5974	151-6014	151-6033	151-6050	152-6067	152-6107
		152-6128	152-6146	153-6163	153-6205	153-6226	153-6243	154-6266	154-6281	155-6309
		155-6325	156-6353	156-6368	157-6393	157-6415	158-6444	158-6469	159-6501	159-6515
		160-6543	160-6557	161-6591	161-6615	162-6644	162-6676	163-6707	163-6724	164-6754
		164-6772	165-6787	165-6836	166-6863	166-6881	167-6903	167-6964	168-6991	168-7039
		169-7061	169-7077	170-7093	170-7109	171-7140				
PEA	= 000200	#18-687	142-5186	143-5253	144-5355	147-5557				
PEHI	= 000200	#18-712								
PELO	= 000100	#18-711								
PRDATA	050064	182-7297	#182-7392							
PRTABL	050420	182-7275	182-7296	#183-7432						
PRTITL	047056	182-7276	#182-7355							
PSW	= 177776	#18-616	*19-745	*21-804	*165-6797	*168-7031				
RDCHR	= 104407	176-7222	#180-7230							
RDDEC	= 104412	#180-7230								
RDLIN	= 104410	177-7224	178-7226	#180-7230						
RDOCT	= 104411	#180-7230								
RECDAT	050520	*141-5152	141-5156	*142-5198	142-5203	*143-5272	143-5278	*143-5283	143-5289	*143-5294
		143-5300	*144-5375	144-5381	*144-5386	144-5392	*144-5397	144-5403	*165-6851	165-6856
		*166-6884	166-6893	*171-7143	171-7147	182-7419	183-7433	#183-7447		
RELCTH	002452	#20-794	32-993	80-1936	81-1971	82-2006	83-2048	84-2095	87-2233	88-2270
		89-2339	90-2427	91-2473	92-2502	93-2531	94-2566	95-2604	98-2717	99-2772
		100-2812	105-2982	109-3169	110-3226	112-3342	113-3392	116-3530	117-3587	119-3703
		120-3763	122-3859	123-3924	124-3970	126-4162	128-4375	129-4423	130-4481	131-4532
		132-4586	133-4629	134-4673	135-4718	137-4861	139-5002	140-5089	141-5140	142-5169
		143-5229	144-5329	145-5413	146-5469	147-5533	148-5629	150-5879	152-6067	154-6266
		156-6353	157-6393	158-6444	160-6543	161-6591	162-6644	163-6707	164-6754	165-6787
		166-6863	167-6903	168-6991	169-7061	170-7093				
RELCTL	002424	#20-786	34-1025	74-1627	75-1673	76-1708	77-1761	78-1838	79-1876	85-2140
		86-2187	96-2642	97-2680	107-3077	108-3127	111-3284	114-3437	115-3488	118-3645
		121-3808	125-4065	127-4268	136-4789	138-4932	149-5753	151-5974	153-6163	155-6309
		159-6501								
SAVR0	046204	#181-7236	*182-7246	182-7342						
SAVR1	046206	#181-7237	*182-7247	182-7343						
SAVR2	046210	#181-7238	*182-7248	182-7344						
SAVR3	046212	#181-7239	*182-7249	182-7345						
SAVR4	046214	#181-7240	*182-7250	182-7346						

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES
SAVR5	046216	#181-7241 *182-7251 182-7347
SCOPE	= 000004	#13-539
SCPCND	= 000004	#18-716 23-820 24-842 25-864 26-885 27-906 28-930 29-947 30-960
		31-976 32-993 33-1010 34-1025 35-1042 36-1057 37-1072 38-1087 39-1104
		40-1118 41-1131 42-1145 43-1160 44-1175 45-1190 46-1205 47-1220 48-1235
		49-1250 50-1260 51-1270 52-1280 53-1290 54-1300 55-1310 56-1320 57-1330
		58-1340 59-1350 60-1360 61-1375 62-1392 63-1408 64-1423 65-1438 66-1453
		67-1468 68-1485 69-1504 70-1514 71-1524 72-1540 73-1605 74-1627 75-1673
		76-1708 77-1761 78-1838 79-1876 80-1936 81-1971 82-2006 83-2048 84-2095
		85-2140 86-2187 87-2233 88-2270 89-2339 90-2427 91-2473 92-2502 93-2531
		94-2566 95-2604 96-2642 97-2680 98-2717 99-2772 100-2812 101-2898 102-2919
		103-2937 104-2959 105-2982 106-3032 107-3077 108-3127 109-3169 110-3226 111-3284
		112-3342 113-3392 114-3437 115-3488 116-3530 117-3587 118-3645 119-3703 120-3763
		121-3808 122-3859 123-3924 124-3970 125-4065 126-4162 127-4268 128-4375 129-4423
		130-4481 131-4532 132-4586 133-4629 134-4673 135-4718 136-4789 137-4861 138-4932
		139-5002 140-5089 141-5140 142-5169 143-5229 144-5329 145-5413 146-5469 147-5533
		148-5629 149-5753 150-5879 151-5974 152-6067 153-6163 154-6266 155-6309 156-6353
		157-6393 158-6444 159-6501 160-6543 161-6591 162-6644 163-6707 164-6754 165-6787
		166-6863 167-6903 168-6991 169-7061 170-7093 171-7127 172-7160
SR0	= 177572	#18-659 *76-1717 *76-1732 *77-1780 *77-1800 *79-1890 *79-1900 *88-2282 *88-2296
		*89-2353 *89-2377 *100-2839 *100-2854 *100-2887 *162-6652 *162-6674
SR3	= 172516	#18-660 *76-1718 *76-1733 *77-1781 *77-1801 *79-1891 *79-1901 *88-2283 *88-2297
		*89-2354 *89-2378 *100-2840 *100-2855 *100-2888 *162-6653 *162-6675
START	001000	14-541 #14-543
STRTLP	002130	#19-726 *19-769 182-7338 182-7341
STRTST	002126	#19-725 19-757 *19-768
SWR	002074	*14-565 #18-593 19-750 19-754 19-761 122-3887 172-7192 182-7252 182-7253
		182-7325 182-7329 182-7348
SWREG	000176	#13-518
TDAR	= 000001	#18-695 80-1938 81-1973 82-2011 83-2053 84-2100 85-2145 86-2192 105-2994
		107-3089 109-3184 109-3189 112-3354 114-3449 116-3545 116-3550 120-3772 126-4166
		127-4272 132-4588 133-4633 134-4675 135-4726 136-4797 137-4869 138-4940 148-5638
		148-5652 148-5661 149-5762 149-5776 149-5785
TPB	= 001000	#18-701 132-4604 133-4649 134-4696 135-4762 136-4834 137-4905 138-4976 140-5114
TPE	= 000040	#18-710
TSTCNT	002140	#19-730 *19-763 19-764 *19-766
TSTID	= 000001	#18-715
TSTIMS	002142	#19-731 19-764
TST1	002576	#23-820
TST10	003364	#30-960
TST100	012730	#86-2187
TST101	013154	#87-2233
TST102	013336	#88-2270
TST103	013654	#89-2339
TST104	014432	#90-2427
TST105	014644	#91-2473
TST106	014776	#92-2502
TST107	015134	#93-2531
TST11	003426	#31-976
TST110	015320	#94-2566
TST111	015516	#95-2604
TST112	015716	#96-2642

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES
TST113	016114	#97-2680
TST114	016314	#98-2717
TST115	016536	#99-2772
TST116	016732	#100-2812
TST117	017324	#101-2898
TST12	003506	#32-993
TST120	017420	#102-2919
TST121	017476	#103-2937
TST122	017604	#104-2959
TST123	017712	#105-2982
TST124	020130	#106-3032
TST125	020324	#107-3077
TST126	020542	#108-3127
TST127	020744	#109-3169
TST13	003602	#33-1010
TST130	021212	#110-3226
TST131	021470	#111-3284
TST132	021746	#112-3342
TST133	022164	#113-3392
TST134	022366	#114-3437
TST135	022604	#115-3488
TST136	023006	#116-3530
TST137	023254	#117-3587
TST14	003652	#34-1025
TST140	023532	#118-3645
TST141	024010	#119-3703
TST142	024234	#120-3763
TST143	024444	#121-3808
TST144	024644	#122-3859
TST145	025116	#123-3924
TST146	025300	#124-3970
TST147	025620	#125-4065
TST15	003746	#35-1042
TST150	026140	#126-4162
TST151	026534	#127-4268
TST152	027130	#128-4375
TST153	027272	#129-4423
TST154	027464	#130-4481
TST155	027650	#131-4532
TST156	030030	#132-4586
TST157	030156	#133-4629
TST16	004016	#36-1057
TST160	030332	#134-4673
TST161	030476	#135-4718
TST162	030726	#136-4789
TST163	031156	#137-4861
TST164	031412	#138-4932
TST165	031646	#139-5002
TST166	032122	#140-5089
TST167	032326	#141-5140
TST17	004066	#37-1072
TST170	032430	#142-5169

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES
TST171	032630	#143-5229
TST172	033166	#144-5329
TST173	033524	#145-5413
TST174	034014	#146-5469
TST175	034304	#147-5533
TST176	034662	#148-5629
TST177	035314	#149-5753
TST2	002672	#24-842
TST20	004136	#38-1087
TST200	035746	#150-5879
TST201	036302	#151-5974
TST202	036636	#152-6067
TST203	037172	#153-6163
TST204	037526	#154-6266
TST205	037650	#155-6309
TST206	037772	#156-6353
TST207	040114	#157-6393
TST21	004216	#39-1104
TST210	040300	#158-6444
TST211	040464	#159-6501
TST212	040606	#160-6543
TST213	040736	#161-6591
TST214	041104	#162-6644
TST215	041316	#163-6707
TST216	041434	#164-6754
TST217	041552	#165-6787
TST22	004262	#40-1118
TST220	042034	#166-6863
TST221	042202	#167-6903
TST222	042732	#168-6991
TST223	043326	#169-7061
TST224	043472	#170-7093
TST225	043640	#171-7127
TST226	043774	#172-7160
TST23	004332	#41-1131
TST24	004402	#42-1145
TST25	004452	#43-1160
TST26	004522	#44-1175
TST27	004572	#45-1190
TST3	002766	#25-864
TST30	004642	#46-1205
TST31	004712	#47-1220
TST32	004762	#48-1235
TST33	005032	#49-1250
TST34	005102	#50-1260
TST35	005152	#51-1270
TST36	005222	#52-1280
TST37	005272	#53-1290
TST4	003062	#26-885
TST40	005342	#54-1300
TST41	005412	#55-1310
TST42	005462	#56-1320

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES
TST43	005532	#57-1330
TST44	005602	#58-1340
TST45	005652	#59-1350
TST46	005722	#60-1360
TST47	005772	#61-1375
TST5	003156	#27-906
TST50	006050	#62-1392
TST51	006126	#63-1408
TST52	006204	#64-1423
TST53	006262	#65-1438
TST54	006340	#66-1453
TST55	006416	#67-1468
TST56	006506	#68-1485
TST57	006604	#69-1504
TST6	003252	#28-930
TST60	006654	#70-1514
TST61	006724	#71-1524
TST62	006774	#72-1540
TST63	007270	#73-1605
TST64	007356	#74-1627
TST65	007554	#75-1673
TST66	007734	#76-1708
TST67	010200	#77-1761
TST7	003322	#29-947
TST70	010556	#78-1838
TST71	010724	#79-1876
TST72	011254	#80-1936
TST73	011442	#81-1971
TST74	011634	#82-2006
TST75	012044	#83-2048
TST76	012264	#84-2095
TST77	012510	#85-2140
TYPBN =	104406	#180-7230
TYPDS =	104405	172-7203 #180-7230
TYPE =	104401	14-553 14-554 14-555 14-556 14-572 89-2416 89-2417 167-6930 167-6931 167-6932 172-7202 172-7204 173-7216 174-7218 175-7220 176-7222 176-7222 176-7222 178-7226 178-7226 179-7228 #180-7230 182-7272 182-7283 182-7285 182-7287 182-7301 182-7303 182-7304 182-7356 182-7358 182-7360 182-7362 182-7364 182-7366 182-7368 182-7370 182-7372 182-7374 182-7376 182-7378 182-7380 182-7382 182-7384 182-7386 182-7388 182-7390
TYPOC =	104402	#180-7230 182-7286 182-7405 182-7407 182-7417 182-7419 182-7427 182-7429
TYPON =	104404	#180-7230
TYPOS =	104403	#180-7230 182-7284 182-7393 182-7394 182-7396 182-7397 182-7399 182-7401 182-7403 182-7409 182-7411 182-7413 182-7415 182-7421 182-7423 182-7425
UCB =	001000	#18-689 40-1119 122-3873 123-3940 150-5900 150-5905 151-5994 151-5999 152-6087 152-6092 153-6184 153-6189 160-6553 161-6604 161-6608
UMPR00 =	170200	#18-661 *72-1591
UMPR01 =	170202	#18-662 *72-1592
UMPR02 =	170204	#18-663 *72-1593
UMPR03 =	170206	#18-664 *72-1594
UMPR04 =	170210	#18-665 *72-1595
UMPR05 =	170212	#18-666 *72-1596

SYMBOL CROSS REFERENCE

SYMBOL	VALUE	REFERENCES							
UMPR06	= 170214	#18-667	*72-1597						
UMPR07	= 170216	#18-668	*72-1598						
UMPR08	= 170220	#18-669	*77-1766	*77-1825					
UMPR09	= 170222	#18-670	*77-1777						
VCIP	= 010000	#18-691	101-2902	102-2922	103-2941	103-2944	104-2963	104-2966	105-2986	106-3036
		107-3081	108-3131	109-3173	110-3232	110-3247	110-3250	111-3290	111-3305	111-3308
		112-3346	113-3396	114-3441	115-3492	116-3534	117-3593	117-3608	117-3611	118-3651
		118-3666	118-3669	122-3863	123-3928	131-4552	134-4694	142-5171	143-5231	143-5266
		144-5331	144-5369	145-5415	145-5453	146-5471	146-5509	147-5535	147-5585	150-5883
		151-5978	152-6071	153-6167	157-6418	158-6472	167-6907	168-6995		
VLD	= 010000	#18-704	105-3010	106-3054	107-3105	108-3149	109-3201	110-3258	111-3316	112-3370
		113-3414	114-3465	115-3510	116-3562	117-3619	118-3677	122-3890	122-3898	122-3907
		122-3915	123-3948	167-6966						
VSIU	= 020000	#18-692	103-2938	103-2947	104-2960	104-2969	105-2983	106-3033	107-3078	108-3128
		109-3170	110-3229	111-3287	112-3343	113-3393	114-3438	115-3489	116-3531	117-3590
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SYMBOL CROSS REFERENCE

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CREF V01

SYMBOL CROSS REFERENCE
SYMBOL VALUE REFERENCES

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SYMBOL CROSS REFERENCE
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SYMBOL CROSS REFERENCE

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SYMBOL CROSS REFERENCE
SYMBOL VALUE REFERENCES

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$UNITM      001462      #15-575
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$XON    =   000021       173-7216    173-7216    173-7216     176-7222
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MACRO CROSS REFERENCE

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MACRO CROSS REFERENCE

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	72-1540	73-1605	74-1627	75-1673	76-1708	77-1761	78-1838	79-1876	80-1936	81-1971
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MACRO CROSS REFERENCE

MACRO NAME	REFERENCES									
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	112-3342	113-3392	114-3437	115-3488	116-3530	117-3587	118-3645	119-3703	120-3763	121-3808
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	19-724	20-781	20-783	23-820	23-820	24-842	24-842	25-864	25-864	26-885
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	79-1876	80-1936	80-1936	81-1971	81-1971	82-2006	82-2006	83-2048	83-2048	84-2095
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	89-2339	90-2427	90-2427	91-2473	91-2473	92-2502	92-2502	93-2531	93-2531	94-2566
	94-2566	95-2604	95-2604	96-2642	96-2642	97-2680	97-2680	98-2717	98-2717	99-2772
	99-2772	100-2812	100-2812	101-2898	101-2898	102-2919	102-2919	103-2937	103-2937	104-2959
	104-2959	105-2982	105-2982	106-3032	106-3032	107-3077	107-3077	108-3127	108-3127	109-3169
	109-3169	110-3226	110-3226	111-3284	111-3284	112-3342	112-3342	113-3392	113-3392	114-3437
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	124-3970	125-4065	125-4065	126-4162	126-4162	127-4268	127-4268	128-4375	128-4375	129-4423
	129-4423	130-4481	130-4481	131-4532	131-4532	132-4586	132-4586	133-4629	133-4629	134-4673
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	149-5753	150-5879	150-5879	151-5974	151-5974	152-6067	152-6067	153-6163	153-6163	154-6266
	154-6266	155-6309	155-6309	156-6353	156-6353	157-6393	157-6393	158-6444	158-6444	159-6501
	159-6501	160-6543	160-6543	161-6591	161-6591	162-6644	162-6644	163-6707	163-6707	164-6754
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	169-7061	170-7093	170-7093	171-7127	171-7127	172-7160	172-7160	172-7189	173-7216	174-7218
	175-7220	176-7222	176-7222	176-7222	177-7224	178-7226	179-7228	180-7230	181-7234	183-7452
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	#182-7411	#182-7413	#182-7415	#182-7421	#182-7423	#182-7425				
TYPOCT	#13-435	182-7286	182-7405	182-7407	182-7417	182-7419	182-7427	182-7429		
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	167-6932	172-7202	182-7272	182-7283	182-7285	182-7301	182-7304	182-7356	182-7358	182-7360
	182-7362	182-7364	182-7366	182-7368	182-7370	182-7372	182-7374	182-7376	182-7378	182-7380

MACRO CROSS REFERENCE CREF V01

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	#41-1145	#42-1160	#43-1175	#44-1190	#45-1205	#46-1220	#47-1235	#48-1250	#49-1260	#50-1270
	#51-1280	#52-1290	#53-1300	#54-1310	#55-1320	#56-1330	#57-1340	#58-1350	#59-1360	#60-1375
	#61-1392	#62-1408	#63-1423	#64-1438	#65-1453	#66-1468	#67-1485	#68-1504	#69-1514	#70-1524
	#71-1540	#72-1605	#73-1627	#74-1673	#75-1708	#76-1761	#77-1838	#78-1876	#79-1936	#80-1971
	#81-2006	#82-2048	#83-2095	#84-2140	#85-2187	#86-2233	#87-2270	#88-2339	#89-2427	#90-2473
	#91-2502	#92-2531	#93-2566	#94-2604	#95-2642	#96-2680	#97-2717	#98-2772	#99-2812	#100-2898
	#101-2919	#102-2937	#103-2959	#104-2982	#105-3032	#106-3077	#107-3127	#108-3169	#109-3226	#110-3284
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	#121-3859	#122-3924	#123-3970	#124-4065	#125-4162	#126-4268	#127-4375	#128-4423	#129-4481	#130-4532
	#131-4586	#132-4629	#133-4673	#134-4718	#135-4789	#136-4861	#137-4932	#138-5002	#139-5089	#140-5140
	#141-5169	#142-5229	#143-5329	#144-5413	#145-5469	#146-5533	#147-5629	#148-5753	#149-5879	#150-5974
	#151-6067	#152-6163	#153-6266	#154-6309	#155-6353	#156-6393	#157-6444	#158-6501	#159-6543	#160-6591
	#161-6644	#162-6707	#163-6754	#164-6787	#165-6863	#166-6903	#167-6991	#168-7061	#169-7093	#170-7127
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