KK11-B

11/44 KK11B CACHE
CKKKAA0

AH-F626A-MC.

FICHE 1 OF 2

JAN 1980
digital
MADE IN USA

KK11-B

11/44 KK11B CACHE
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AH-F626A-MC

FICHE 2 OF 2

JAN 1980
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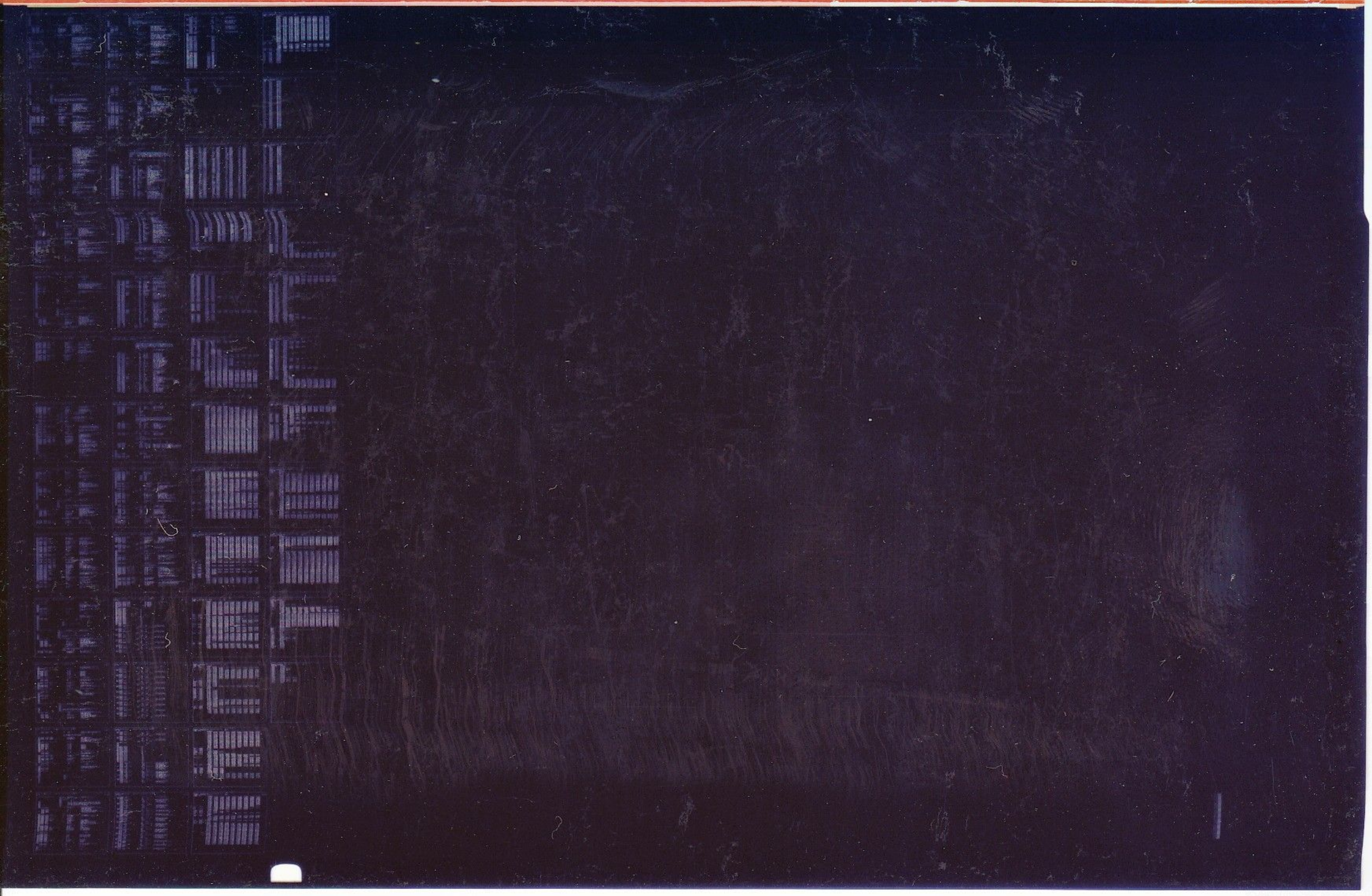

```
.REM %
```

IDENTIFICATION

PRODUCT CODE:	AC-F624A-MC
PRODUCT NAME:	CKKKAA0 11/44 KK11B CACHE
DATE CREATED:	APRIL 1979
MAINTAINER:	DIAGNOSTIC ENGINEERING
AUTHOR:	JOHN W. CIUKAJ

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52
53
54                          1.0 HISTORY SECTION
55                          -------------------
56
57                  CKKKAA0 WAS RELEASED OCT 1979
58
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                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

3.4 EXECUTION TIMES

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

```
370
371                                    4.0 ERROR INFO
372                                    -------------
373
374
375                                    4.1     IN ADDITION TO TESTNO AND ERRPC BEING PRINTED WHEN AN ERROR
376                                            OCCURS, ADDITIONAL INFORMATION CAN BE GIVEN DEPENDING ON
377                                            THE TEST. THE INFO. IS IN THE FORM OF DATA DESCRIBED IN A
378                                            FASHION WHICH RELATES TO THE LOGIC BEING TESTED AND CAN 'ID
379                                            IN ISOLATING THE FAILURE.
380                                            FOR EXAMPLE, A TEST MAY VERIFY THAT THE CACHE TAG STORE RAMS
381                                            CAN BE LOADED FROM THE CACHE ADDRESS LINES (CA<21:13>) AND
382                                            THEN BE READ FROM THE CACHE HIT REGISTER BITS 15:7 (CHR<15:7>).
383                                            AN ERROR PRINTOUT ,THEREFORE,WOULD  LOOK LIKE THE FOLLOWING:
384
385                                                    TESTNO          ERRPC           CHR157          CA2113
386                                                    ------          -----           -----           ------
387
388                                                       102          13234             001           000
389
390                                            WHERE:  CHR157 SPECIFIES DATA READ FROM CACHE HIT REGISTER
391                                                    BITS 15:7
392
393                                            AND     CA3113 SPECIFIES THE ADDRESS PATTERN ON THE CACHE ADDRESS
394                                                    LINES 21:13 USED TO LOAD THE TAG STORE
395
396                                            CA2113 IS ANALAGOUS TO 'DATA EXPECTED' AND CHR157 IS ANALAGOUS
397                                            TO 'DATA RECEIVED'.
398
399                                    4.2 UNCONTROLLED ERRORS
400
401                                            IF AT ANY TIME THE PROGRAM STOPS WITHOUT PROPER ERROR
402                                            INDICATION EXAMINING LOCATION SPECIFIED BY $TESTN WILL
403                                            INDICATE WHAT TEST THE PROGRAM HAD REACHED.
```

```
405
406
407
408                                    5.0 HANDLERS AND COMMON ROUTINES
409                                        ----------------------------
410
411
412                                RELCTL: THIS ROUTINE,WHEN CALLED, WILL RELOCATE ALL TEST CODE
413                                        OF THE TEST UP TO AND INCLUDING THE LOCATION SPECIFIED
414                                        BY 10$: TO LOW CACHE BUFFER AREA BEGINNING AT LOCATION
415                                        60000. WHEN THIS HAS BEEN DONE THE ROUTINE WILL JUMP
416                                        TO LOCATION 60000 FOR TEST EXECUTION.
417
418
419                                RELCTH: THIS ROUTINE,WHEN CALLED, WILL RELOCATE ALL TEST CODE
420                                        OF THE TEST UP TO AND INCLUDING THE LOCATION SPECIFIED
421                                        BY 10$: TO HIGH CACHE BUFFER AREA BEGINNING AT LOCATION
422                                        70000. WHEN THIS HAS BEEN DONE THE ROUTINE WILL JUMP
423                                        TO LOCATION 70000 FOR TEST EXECUTION.
424
425                                $SCPSET: THIS ROUTINE IS PERFORMED AT THE BEGINNING OF EACH
426                                         TEST. IT SETS UP VECTORS TO ACCOMPLISH LOOP ON TEST
427                                         AND LOOP ON ERROR. THE LOCATIONS SPECIFIED BY 40$,
428                                          1$, AND 25$ ARE PASSED TO THE ROUTINE AND ARE
429                                         ADDRESS LOCATIONS WHICH ARE INDICATIVE OF WHERE THOSE
430                                         LOCATIONS WILL BE WHEN THE TEST IS RELOCATED TO EITHER
431                                         HI OR LO CACHE BUFFER AREA.
432
433                                $ERROR:  THIS ROUTINE IS CALLED WHEN THERE IS AN ERROR.
434                                         IT WILL ALWAYS TYPE FAILING TEST NUMBER AND FAILING
435                                         ERROR PC. IT MAY TYPE ADDITIONAL DATA INFO. DEPENDING
436                                         ON THE TEST (USES THE ARGUEMENTS PASSED BY
437                                         THE TEST TO THE ROUTINE).
438
439
440                                %
```

```
                                .TITLE  CKKKAA0 11-44 KK11B CACHE
                                ;*COPYRIGHT (C) OCT 1979
                                ;*DIGITAL EQUIPMENT CORP.
                                ;*MAYNARD, MASS. 01754
                                ;*
                                ;*PROGRAM BY JOHN W. CIUKAJ
                                ;*
                                ;*THIS PROGRAM WAS ASSEMBLED USING THE PDP-11 MAINDEC SYSMAC
                                ;*PACKAGE (MAINDEC-11-DZQAC-C3), JAN 19, 1977.
                                ;*
                        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  002134                  $SCPSET
000022  000340                  340
                        000030          .=30
000030  045252                  $ERROR
000032  000340                  340
000034  045200                  $TRAP
000036  000340                  340
                        000042          .=42
000042  000000                  .WORD 0
                        000046          .=46
000046  044154                  .WORD $ENDAD
                        000052          .=52
000052  000000                  .WORD   0
```

```
                000200                          .=200
000200  000137  001000                          JMP START
                001000                          .=1000
001000                          START:
001000  000005                                  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  000533                                  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$:  .ASCIZ  <CRLF>/CKKKAA0 11-44 KK11B CACHE/
001110                                  64$:
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  000000                                  HALT                    ;HALT PROGRAM

001320  012737  000006  000004          5$:     MOV #6,4                ;RESTORE VECTORS
001326  005037  000006                          CLR 6
001332  005037  001466                          CLR $PASS               ;CLEAR PASS COUNT
001336  132737  000200  001501                  BITB #APTSIZE,$ENVM      ;IS APT SIZING?
001344  001403                                  BEQ 1$                  ;NO
001346  012737  001502  002064                  MOV #$SWREG,SWR         ;YES;USE APT SWITCH REGISTER
001354  005737  000042                  1$:     TST @#42                ;IS THIS MANUAL MODE?
001360  001404                                  BEQ 3$                  ;YES TYPE ID
001362  023737  000042  000046                  CMP @#42,@#46           ;IS THIS ACT 11 QV OR AUTO MODE?
001370  001423                                  BEQ 2$                  ;YES;SKIP TITLE
001372  000240                          3$:     NOP
001374  000240                                  NOP
001376  104401  001404                          TYPE    ,73$            ;;TYPE ASCIZ STRING
001402  000416                                  BR      72$             ;;GET OVER THE ASCIZ
                                        ;;73$:  .ASCIZ  <CRLF>/CKKKAA0 11-44 KK11B CACHE /
001440                                  72$:

001440  000137  002400                  2$:     JMP BEGIN               ;START TEST
```

```
618                                     .SBTTL  APT PARAMETER BLOCK

                                        ;;******************************************************************
                                        ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                        ;;******************************************************************
            001444                              .$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 001444                              $APTHDR ;;POINT TO APT HEADER BLOCK
            001444                              .=.$X   ;;RESET LOCATION COUNTER
                                        ;;******************************************************************
                                        ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                        ;INTERFACE SPEC.

     001444                             $APTHD:
     001444 000000                      $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
     001446 001460                      $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
     001450 000005                      $TSTM:  .WORD   5       ;;RUN TIM OF LONGEST TEST
     001452 000010                      $PASTM: .WORD   10      ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
     001454 000000                      $UNITM: .WORD   0       ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
     001456 000052                              .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
619                                     .SBTTL  APT MAILBOX-ETABLE

                                        ;;******************************************************************
                                        .EVEN
     001460                             $MAIL:                  ;;APT MAILBOX
     001460 000000                      $MSGTY: .WORD   AMSGTY  ;;MESSAGE TYPE CODE
     001462 000000                      $FATAL: .WORD   AFATAL  ;;FATAL ERROR NUMBER
     001464 000000                      $TESTN: .WORD   ATESTN  ;;TEST NUMBER
     001466 000000                      $PASS:  .WORD   APASS   ;;PASS COUNT
     001470 000000                      $DEVCT: .WORD   ADEVCT  ;;DEVICE COUNT
     001472 000000                      $UNIT:  .WORD   AUNIT   ;;I/O UNIT NUMBER
     001474 000000                      $MSGAD: .WORD   AMSGAD  ;;MESSAGE ADDRESS
     001476 000000                      $MSGLG: .WORD   AMSGLG  ;;MESSAGE LENGTH
     001500                             $ETABLE:                ;;APT ENVIRONMENT TABLE
     001500      000                    $ENV:   .BYTE   AENV    ;;ENVIRONMENT BYTE
     001501      000                    $ENVM:  .BYTE   AENVM   ;;ENVIRONMENT MODE BITS
     001502 000000                      $SWREG: .WORD   ASWREG  ;;APT SWITCH REGISTER
     001504 000000                      $USWR:  .WORD   AUSWR   ;;USER SWITCHES
     001506 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,PDC=07,Q=10
                                        ;*                      BIT 10=REAL TIME CLOCK
                                        ;*                      BIT  9=FLOATING POINT PROCESSOR
                                        ;*                      BIT  8=MEMORY MANAGEMENT
     001510      000                    $MAMS1: .BYTE   AMAMS1  ;;HIGH ADDRESS,M.S. BYTE
     001511      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
     001512 000000                      $MADR1: .WORD   AMADR1  ;;HIGH ADDRESS,BLK#1
                                        ;*                        MEM.LAST ADDR.=3 BYTES,THIS WORD AND LOW OF ''TYPE'' ABOVE
     001514      000                    $MAMS2: .BYTE   AMAMS2  ;;HIGH ADDRESS,M.S. BYTE
     001515      000                    $MTYP2: .BYTE   AMTYP2  ;;MEM.TYPE,BLK#2
```

```
001516  000000                  $MADR2: .WORD   AMADR2  ;;MEM.LAST ADDRESS,BLK#2
001520     000                  $MAMS3: .BYTE   AMAMS3  ;;HIGH ADDRESS,M.S.BYTE
001521     000                  $MTYP3: .BYTE   AMTYP3  ;;MEM.TYPE,BLK#3
001522  000000                  $MADR3: .WORD   AMADR3  ;;MEM.LAST ADDRESS,BLK#3
001524     000                  $MAMS4: .BYTE   AMAMS4  ;;HIGH ADDRESS,M.S.BYTE
001525     000                  $MTYP4: .BYTE   AMTYP4  ;;MEM.TYPE,BLK#4
001526  000000                  $MADR4: .WORD   AMADR4  ;;MEM.LAST ADDRESS,BLK#4
001530  000000                  $VECT1: .WORD   AVECT1  ;;INTERRUPT VECTOR#1,BUS PRIORITY#1
001532  000000                  $VECT2: .WORD   AVECT2  ;;INTERRUPT VECTOR#2BUS PRIORITY#2
001534  000000                  $BASE:  .WORD   ABASE   ;;BASE ADDRESS OF EQUIPMENT UNDER TEST
001536  000000                  $DEVM:  .WORD   ADEVM   ;;DEVICE MAP
001540  000000                  $CDW1:  .WORD   ACDW1   ;;CONTROLLER DESCRIPTION WORD#1
001542  000000                  $CDW2:  .WORD   ACDW2   ;;CONTROLLER DESCRIPTION WORD#2
001544  000000                  $DDW0:  .WORD   ADDW0   ;;DEVICE DESCRIPTOR WORD#0
001546  000000                  $DDW1:  .WORD   ADDW1   ;;DEVICE DESCRIPTOR WORD#1
001550  000000                  $DDW2:  .WORD   ADDW2   ;;DEVICE DESCRIPTOR WORD#2
001552  000000                  $DDW3:  .WORD   ADDW3   ;;DEVICE DESCRIPTOR WORD#3
001554  000000                  $DDW4:  .WORD   ADDW4   ;;DEVICE DESCRIPTOR WORD#4
001556  000000                  $DDW5:  .WORD   ADDW5   ;;DEVICE DESCRIPTOR WORD#5
001560  000000                  $DDW6:  .WORD   ADDW6   ;;DEVICE DESCRIPTOR WORD#6
001562  000000                  $DDW7:  .WORD   ADDW7   ;;DEVICE DESCRIPTOR WORD#7
001564  000000                  $DDW8:  .WORD   ADDW8   ;;DEVICE DESCRIPTOR WORD#8
001566  000000                  $DDW9:  .WORD   ADDW9   ;;DEVICE DESCRIPTOR WORD#9
001570  000000                  $DDW10: .WORD   ADDW10  ;;DEVICE DESCRIPTOR WORD#10
001572  000000                  $DDW11: .WORD   ADDW11  ;;DEVICE DESCRIPTOR WORD#11
001574  000000                  $DDW12: .WORD   ADDW12  ;;DEVICE DESCRIPTOR WORD#12
001576  000000                  $DDW13: .WORD   ADDW13  ;;DEVICE DESCRIPTOR WORD#13
001600  000000                  $DDW14: .WORD   ADDW14  ;;DEVICE DESCRIPTOR WORD#14
001602  000000                  $DDW15: .WORD   ADDW15  ;;DEVICE DESCRIPTOR WORD#15

001604                          $ETEND:

620                             .SBTTL  APT COMMUNICATIONS ROUTINE

                                ;;**********************************************************************
001604  112737  000001  002050  $ATY1:  MOVB    #1,$FFLG        ;;TO REPORT FATAL ERROR
001612  112737  000001  002046  $ATY3:  MOVB    #1,$MFLG        ;;TO TYPE A MESSAGE
001620  000403                  BR      $ATYC
001622  112737  000001  002050  $ATY4:  MOVB    #1,$FFLG        ;;TO ONLY REPORT FATAL ERROR
001630                          $ATYC:
001630  010046                  MOV     R0,-(SP)        ;;PUSH R0 ON STACK
001632  010146                  MOV     R1,-(SP)        ;;PUSH R1 ON STACK
001634  105737  002046          TSTB    $MFLG           ;;SHOULD TYPE A MESSAGE?
001640  001450                  BEQ     5$              ;;IF NOT:  BR
001642  122737  000001  001500  CMPB    #APTENV,$ENV    ;;OPERATING UNDER APT?
001650  001031                  BNE     3$              ;;IF NOT:  BR
001652  132737  000100  001501  BITB    #APTSPOOL,$ENVM ;;SHOULD SPOOL MESSAGES?
001660  001425                  BEQ     3$              ;;IF NOT:  BR
001662  017600  000004          MOV     @4(SP),R0       ;;GET MESSAGE ADDR.
001666  062766  000002  000004  ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
001674  005737  001460          1$:     TST     $MSGTYPE        ;;SEE IF DONE W/ LAST XMISSION?
001700  001375                  BNE     1$              ;;IF NOT:  WAIT
001702  010037  001474          MOV     R0,$MSGAD       ;;PUT ADDR IN MAILBOX
001706  105720                  2$:     TSTB    (R0)+           ;;FIND END OF MESSAGE
001710  001376                  BNE     2$
001712  163700  001474          SUB     $MSGAD,R0       ;;SUB START OF MESSAGE
```

```
001716  006200                          ASR     R0              ;;GET MESSAGE LNGTH IN WORDS
001720  010037  001476                  MOV     R0,$MSGLGT      ;;PUT LENGTH IN MAILBOX
001724  012737  000004  001460          MOV     #4,$MSGTYPE     ;;TELL APT TO TAKE MSG.
001732  000413                          BR      5$
001734  017637  000004  001760  3$:     MOV     @4(SP),4$       ;;PUT MSG ADDR IN JSR LINKAGE
001742  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDRESS
001750  013746  177776                  MOV     177776,-(SP)    ;;PUSH 177776 ON STACK
001754  004737  044174                  JSR     PC,$TYPE        ;;CALL TYPE MACRO
001760  000000                  4$:     .WORD   0
001762                          5$:
001762  105737  002050          10$:    TSTB    $FFLG           ;;SHOULD REPORT FATAL ERROR?
001766  001416                          BEQ     12$             ;;IF NOT:  BR
001770  005737  001500                  TST     $ENV            ;;RUNNING UNDER APT?
001774  001413                          BEQ     12$             ;;IF NOT:  BR
001776  005737  001460          11$:    TST     $MSGTYPE        ;;FINISHED LAST MESSAGE?
002002  001375                          BNE     11$             ;;IF NOT:  WAIT
002004  017637  000004  001462          MOV     @4(SP),$FATAL   ;;GET ERROR #
002012  062766  000002  000004          ADD     #2,4(SP)                ;;BUMP RETURN ADDR.
002020  005237  001460                  INC     $MSGTYPE        ;;TELL APT TO TAKE ERROR
002024  105037  002050          12$:    CLRB    $FFLG           ;;CLEAR FATAL FLAG
002030  105037  002047                  CLRB    $LFLG           ;;CLEAR LOG FLAG
002034  105037  002046                  CLRB    $MFLG           ;;CLEAR MESSAGE FLAG
002040  012601                          MOV     (SP)+,R1        ;;POP STACK INTO R1
002042  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
002044  000207                          RTS     PC              ;;RETURN
002046     000                  $MFLG:  .BYTE   0               ;;MESSG. FLAG
002047     000                  $LFLG:  .BYTE   0               ;;LOG FLAG
002050     000                  $FFLG:  .BYTE   0               ;;FATAL FLAG
                                        .EVEN
            000200                      APTSIZE=200
            000001                      APTENV=001
            000100                      APTSPOOL=100
            000040                      APTCSUP=040
621
622                                     ;;*****************************************************************
623                                     ;       USER LABELS
624                                     ;;*****************************************************************
625
626 002052  000000          LOOP:   .WORD   0
627 002054  000000          CMRPAT: .WORD   0
628 002056  000000          CHRPAT: .WORD   0
629 002060  000000          FAIL1:  .WORD   0
630 002062  000000          FAIL2:  .WORD   0
631
632
633 002064  177570          SWR:    .WORD   177570
634 002066  177560          $TKS:   177560
635 002070  177562          $TKB:   177562
636 002072  177564          $TPS:   177564
637 002074  177566          $TPB:   177566
638 002076     000          $NULL:  .BYTE   0
639 002077     002          $FILLS: .BYTE   2
640 002100     012          $FILLC: .BYTE   12
641 002101     000          $TPFLG: .BYTE   0
642 002102     207  377  377 $BELL:  .ASCIZ  <207><377><377>
    002105     000
643 002106     077          $QUES:  .ASCII  /?/
```

```
    644 002107      015                     $CRLF:  .ASCII  <15>
    645 002110      012     000             $LF:    .ASCIZ  <12>
    646 002112      377     377     000     $ENULL: .BYTE   -1,-1,0
    647                                             .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
 020000                 BIT13 =  20000
 040000                 BIT14 = 40000
 100000                 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
```

```
                                                UMPR04=170210
                                                UMPR05=170212
                                                UMPR06=170214
                                                UMPR07=170216
                                                UMPR08=170220
                                                UMPR09=170222
                                                BECC = 170002
                                                BEBA = 170004
                                                BEDA = 170000
                                                BECR1 = 170006
                                                BECR2 = 170016

                                                APTSIZE=200
                                                APTENV=001
                                                APTSPOOL=100
                                                APTCSUP=040

                        ;CCR REGISTER
                        DCPI=1
                        FMLO=4
                        FMHI=10
                        WWPD=100
                        PEA=200
                        FC=400
                        UCB=1000
                        WWPT=2000
                        VCIP=10000
                        VSIU=20000

                        ;CMR REGISTER
                        TDAR=1
                        HODO=2
                        EHA=4
                        AM=10
                        ESA=20
                        HIT=400
                        TPB=1000
                        LPB=2000
                        HPB=4000
                        VLD=10000
                        CM3=20000
                        CM2=40000
                        CM1=100000

                        ;CME REGISTER
                        TPE=40
                        PELO=100
                        PEHI=200
                        CMPE=100000

                                                TSTID=1
                                                SCPCND=4
                                                OFF=1015
```

```
                                ;;*****************************************************************
                                ;       SETUP TEST CONDITIONS:
                                ;                               1. TEST ITERATIONS
                                ;                               2. LOAD TEST VECTORS FOR LOOP ON TEST,
                                ;                                  LOOP ON ERROR
                                ;
                                ;;*****************************************************************

002116  000000          STRTST: .WORD   0
002120  000000          STRTLP: .WORD   0
002122  000000          ADRSYNC: .WORD  0
002124  000000          ADRJMP: .WORD   0
002126  000000          ADR1$:  .WORD   0
002130  000000          TSTCNT: .WORD   0
002132  000001          TSTIMS: .WORD   1.


002134                  $SCPSET:
002134  012737  000340  177776          MOV #340,PSW            ;CPU HI PRIORITY
002142  022737  000001  001464          CMP #1,$TESTN           ;IS THIS TEST 1?
002150  001434                          BEQ 3$                  ;YES,DO NOT CONSIDER LOOP ON TEST
002152  032777  040000  177704          BIT #BIT14,@SWR         ;LOOP ON TEST?
002160  001413                          BEQ 4$                  ;NO
002162  013702  001464                  MOV $TESTN,R2           ;GET PRESENT TEST NUMBER
002166  005302                          DEC R2                  ;GET LAST TEST NUMBER
002170  120277  177670                  CMPB R2,@SWR            ;IS THIS THE TEST?
002174  001005                          BNE 4$                  ;NO
002176  022626                  5$:     CMP (SP)+,(SP)+         ;YES;PREPARE FOR LOOP ON TEST
002200  005337  001464                  DEC $TESTN              ;
002204  000177  177706                  JMP @STRTST             ;GO LOOP ON TEST

002210  005737  001466          4$:     TST $PASS               ;FIRST PASS?
002214  001412                          BEQ 3$                  ;YES;INHIBIT TEST ITERATIONS
002216  032777  004000  177640          BIT #BIT11,@SWR         ;INHIBIT ITERATIONS?
002224  001006                          BNE 3$                  ;YES
002226  005237  002130                  INC TSTCNT              ;INCREMENT TEST ITERATION COUNTER
002232  023737  002132  002130          CMP TSTIMS,TSTCNT       ;ITERATIONS COMPLETE?
002240  001356                          BNE 5$                  ;NO CONTINUE WITH TEST


002242  005037  002130          3$:     CLR TSTCNT
002246  011601                          MOV (SP),R1             ;GET ADDRESS OF FIRST ARGUEMENT
002250  012137  002116                  MOV (R1)+,STRTST        ;LOCATION OF START OF TEST
002254  012137  002120                  MOV (R1)+,STRTLP        ;LOCATION OF START OF SCOPE LOOP
002260  012137  002122                  MOV (R1)+,ADRSYNC       ;ADDRESS LOADED INTO AMR FOR SCOPE SYNC
002264  012137  002124                  MOV (R1)+,ADRJMP        ;ADDRESS OF END OF SCOPE LOOP AND
                                                                ;WHERE 'JMP' IS WRITTEN
002270  013737  002124  002126          MOV ADRJMP,ADR1$        ;
002276  062737  000002  002126          ADD #2,ADR1$            ;LOCATION WHERE '1$' IS WRITTEN
002304  012777  000240  177612          MOV #240,@ADRJMP        ;INITIALIZE SCOPE LOCATIONS
002312  012777  000240  177606          MOV #240,@ADR1$
002320  010116                          MOV R1,(SP)             ;SETUP STACK FOR RETURN
002322  000002                          RTI
```

```
                        ;;*****************************************************************
                        ;                       RELOCATION HANDLERS
                        ;;*****************************************************************


002324  012701  060000  RELCTL:       MOV #LOW1,R1            ;START OF LOW SPACE
002330  012402                        MOV (R4)+,R2            ;END OF MOVE
002332  012421                1$:     MOV (R4)+,(R1)+         ;TRANSFER TEST
002334  020402                        CMP R4,R2               ;PROCEED TO STOP MARK
002336  001375                        BNE 1$
002340  013721  002350                MOV 2$,(R1)+            ;RETURN INSTRUCTION
002344  000137  060000                JMP 60000               ;START TESTS
002350  000204                2$:     RTS R4


002352  012701  070000  RELCTH:       MOV #HIGH1,R1           ;START OF HI SPACE
002356  012402                        MOV (R4)+,R2            ;END OF MOVE
002360  012421                1$:     MOV (R4)+,(R1)+         ;TRANSFER TEST
002362  020402                        CMP R4,R2               ;PROCEED TO STOP MARK
002364  001375                        BNE 1$
002366  013721  002376                MOV 2$,(R1)+            ;RETURN INSTRUCTION
002372  000137  070000                JMP 70000               ;START TESTS
002376  000204                2$:     RTS R4
```

```
 847 002400  012706  000500          BEGIN:      MOV #500,SP             ;SET UP STACK
 848 002404  000005                              RESET
 849 002406  012737  000340  177776              MOV #340,PSW            ;CPU HI PRIORITY
 850 002414  012737  001015  177746              MOV #OFF,CCR            ;DISABLE CACHE
 851 002422  005037  001464                      CLR $TESTN              ;RESET TEST ID COUNTER
 852 002426  012737  000002  000000              MOV #2,@#0              ;INITIALIZE A FEW VECTORS
 853 002434  005037  000002                      CLR @#2
 854 002440  012737  000006  000004              MOV #6,@#4
 855 002446  005037  000006                      CLR @#6
 856 002452  012737  000116  000114              MOV #116,@#114
 857 002460  005037  000116                      CLR @#116
 858 002464  005037  002052                      CLR LOOP                ;SOFTWARE DELAY
 859 002470  005337  002052              1$:     DEC LOOP
 860 002474  001375                      BNE 1$
 861
 862
```

```
                                .SBTTL *
                                .SBTTL
                                .SBTTL *                CACHE REGISTER RESPONSE TESTS
                                .SBTTL
                                .SBTTL *

002476  005237  001464          T1:             INC $TESTN              ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 1
                                .SBTTL
                                ;;*****************************************************************
                                .SBTTL  ATTEMPT READ INTO CME TO TEST ADDRESS SELECT LOGIC
                                .SBTTL  IF TIME OUT OCCURES THEN LOGIC IN FAULT
                                .SBTTL
                                ;;*****************************************************************
002502  000004                          SCOPE                   ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
002504  002514                          40$                     ;TEST START LOCATION
002506  002514                          1$                      ;LOOP ON ERROR START LOCATION
002510  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
002512  002540                          25$                     ;LOOP ON ERROR END LOCATION
002514                          40$:
002514  012737  002546  000004    1$:     MOV #2$,4               ;SETUP TRAP VECTOR
002522  012737  000340  000006            MOV #340,6
002530  005737  177744                    TST CME         ;READ PARITY REGISTER
002534  000240                          NOP
002536  000240                          NOP

002540  000240                  25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
002542  000240                          NOP                     ;FOR  LOOP ON ERROR

002544  000411                          BR 10$                  ;NO FAULT;GO TO NEXT TEST
002546  022626                  2$:     CMP (SP)+,(SP)+         ;READJUST STACK DUE TO INTERRUPT
002550  012737  000006  000004          MOV #6,4                ;RESTORE TRAP VECTOR
002556  005037  000006                  CLR 6

002562  104000                          ERROR                           ;ERROR
                                                                        ;-----
002564  002562                          .-2
                                                                ;CACHE REGISTER RESPONSE TESTS
                                                                ;READING PARITY FAULT REGISTER
                                                                ;CAUSED TIMEOUT

002566  000000                          0
002570  000240                  10$:     NOP             ;END OF TEST

002572  005237  001464          T2:             INC $TESTN              ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 2
                                .SBTTL
                                ;;*****************************************************************
                                .SBTTL  ATTEMPT READ INTO CCR TO CHECK ADDRESS SELECT LOGIC
                                .SBTTL  IF TIME OUT OCCURES THEN LOGIC IN FAULT
                                .SBTTL
```

```
                        ;;*****************************************************************
                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                        ;ERROR/LOOP ON TEST
002600  002610                  40$                     ;TEST START LOCATION
002602  002610                  1$                      ;LOOP ON ERROR START LOCATION
002604  000000                  0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
002606  002634                  25$                     ;LOOP ON ERROR END LOCATION
002610                  40$:
002610  012737  002642  000004 1$:     MOV #2$,4               ;SETUP TRAP VECTOR
002616  012737  000340  000006        MOV #340,6
002624  005737  177746                TST CCR                 ;REA  CACHE CONTROL REGISTER
002630  000240                        NOP
002632  000240                        NOP

002634  000240          25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
002636  000240                  NOP                     ;FOR  LOOP ON ERROR

002640  000411                  BR 10$                  ;NO FAULT;GO TO NEXT TEST
002642  022626          2$:     CMP (SP)+,(SP)+         ;READJUST STACK DUE TO INTERRUPT
002644  012737  000006  000004        MOV #6,4                ;RESTORE TRAP VECTOR
002652  005037  000006                CLR 6

002656  104000                  ERROR                           ;ERROR
                                                                ;-----
002660  002656                  .-2
                                                        ;CACHE REGISTER RESPONSE TESTS
                                                        ;READING CACHE CONTROL REGISTER
                                                        ;CAUSED TIMEOUT

002662  000000                  0
002664  000240          10$:    NOP             ;END OF TEST

                T3:             INC $TESTN              ;UPDATE TEST ID
                ;;*****************************************************************
                .SBTTL
                .SBTTL TEST 3
                .SBTTL
                ;;*****************************************************************
                .SBTTL  ATTEMPT READ INTO CMR TO  CHECK ADDRESS SELECT LOGIC
                .SBTTL  IF TIME OCCURES THEN LOGIC IN FAULT
                .SBTTL
                ;;*****************************************************************
002672  000004                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                        ;ERROR/LOOP ON TEST
002674  002704                  40$                     ;TEST START LOCATION
002676  002704                  1$                      ;LOOP ON ERROR START LOCATION
002700  000000                  0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
002702  002730                  25$                     ;LOOP ON ERROR END LOCATION
002704                  40$:
002704  012737  002736  000004 1$:     MOV #2$,4               ;SETUP TRAP VECTOR
002712  012737  000340  000006        MOV #340,6
002720  005737  177750                TST CMR                 ;READ MAINTENANCE REGISTER
002724  000240                        NOP
002726  000240                        NOP

002730  000240          25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
```

```
    002732  000240                                 NOP                      ;FOR  LOOP ON ERROR

    002734  000411                                 BR 10$                   ;NO FAULT;GO TO NEXT TEST
    002736  022626                         2$:     CMP (SP)+,(SP)+          ;READJUST STACK DUE TO INTERRUPT
    002740  012737  000006  000004                 MOV #6,4                 ;RESTORE TRAP VECTOR
    002746  005037  000006                         CLR 6

    002752  104000                                 ERROR                            ;ERROR
                                                                                    ;-----
    002754  002752                                 .-2
                                                                            ;CACHE REGISTER RESPONSE TESTS
                                                                            ;READING MAINTENANCE REGISTER
                                                                            ;CAUSED TIMEOUT

    002756  000000                                 0
    002760  000240                         10$:    NOP           ;END OF TEST


    002762  005237  001464             T4:         INC $TESTN               ;UPDATE TEST ID
                                       ;;*****************************************************************
                                       .SBTTL
                                       .SBTTL TEST 4
                                       .SBTTL
                                       ;;*****************************************************************
                                       .SBTTL  ATTEMPT READ INTO CHR TO CHECK ADDRESS SELECT LOGIC
                                       .SBTTL  IF TIME OUT OCCURES THEN LOGIC IN FAULT
                                       .SBTTL
                                       ;;*****************************************************************
    002766  000004                                 SCPCND                   ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                            ;ERROR/LOOP ON TEST
    002770  003000                                 40$                      ;TEST START LOCATION
    002772  003000                                 1$                       ;LOOP ON ERROR START LOCATION
    002774  000000                                 0                        ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
    002776  003024                                 25$                      ;LOOP ON ERROR END LOCATION
    003000                                 40$:
    003000  012737  003032  000004         1$:     MOV #2$,4                ;SETUP TRAP VECTOR
    003006  012737  000340  000006                 MOV #340,6
    003014  005737  177752                         TST CHR                  ;READ HIT REGISTER
    003020  000240                                 NOP
    003022  000240                                 NOP

    003024  000240                         25$:    NOP                      ;INSTRUCTION 'JMP 1$' PLACED HERE
    003026  000240                                 NOP                      ;FOR  LOOP ON ERROR

    003030  000411                                 BR 10$                   ;NO FAULT;GO TO NEXT TEST
    003032  022626                         2$:     CMP (SP)+,(SP)+          ;READJUST STACK DUE TO INTERRUPT
    003034  012737  000006  000004                 MOV #6,4                 ;RESTORE TRAP VECTOR
    003042  005037  000006                         CLR 6

    003046  104000                                 ERROR                            ;ERROR
                                                                                    ;-----
    003050  003046                                 .-2
                                                                            ;CACHE REGISTER RESPONSE TESTS
                                                                            ;READING HIT REGISTER
                                                                            ;CAUSED TIMEOUT

    003052  000000                                 0
```

```
 971 003054  000240                        10$:    NOP             ;END OF TEST
 972
 973
 974 003056  005237  001464          T5:           INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 5
                                     .SBTTL
 975                                 ;;*****************************************************************
 976                                 .SBTTL  ATTEMPT READ INTO CDR TO CHECK ADDRESS SELECT LOGIC
 977                                 .SBTTL  IF TIMEOUT OCCURS THEN LOGIC IN FAULT
 978                                 .SBTTL
 979                                 ;;*****************************************************************
 980 003062  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     003064  003074                          40$                     ;TEST START LOCATION
     003066  003074                          1$                      ;LOOP ON ERROR START LOCATION
     003070  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     003072  003120                          25$                     ;LOOP ON ERROR END LOCATION
     003074                              40$:
 981 003074  012737  003126  000004      1$:     MOV #2$,4           ;SETUP TRAP VECTOR
 982 003102  012737  000340  000006              MOV #340,6
 983 003110  005737  177754                      TST CDR             ;READ DATA REGISTER
 984 003114  000240                              NOP
 985 003116  000240                              NOP
 986
     003120  000240                      25$:    NOP                 ;INSTRUCTION 'JMP 1$' PLACED HERE
     003122  000240                              NOP                 ;FOR  LOOP ON ERROR

 987 003124  000411                              BR 10$              ;NO FAULT;GO TO NEXT TEST
 988 003126  022626                      2$:     CMP (SP)+,(SP)+     ;READJUST STACK DUE TO INTERRUPT
 989 003130  012737  000006  000004              MOV #6,4            ;RESTORE TRAP VECTOR
 990 003136  005037  000006                      CLR 6
 991
     003142  104000                              ERROR                       ;ERROR
                                                                             ;-----
     003144  003142                              .-2
 992                                                                 ;CACHE REGISTER RESPONSE TESTS
 993                                                                 ;READING DATA REGISTER
 994                                                                 ;CAUSED TIMEOUT
 995
 996 003146  000000                          0
 997 003150  000240                      10$:    NOP             ;END OF TEST
 998
 999
1000 003152  005237  001464          T6:           INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 6
                                     .SBTTL
1001                                 ;;*****************************************************************
1002                                 .SBTTL  TESTING ADDRESS SELECTION LOGIC BY WRITING ONE INTO UNUSED
1003                                 .SBTTL  CME REGISTER BIT00 THEN READ CONTENTS OF REGISTER BACK
1004                                 .SBTTL  LOOKING TO SEE IF BIT00 STILL READS AS 0.
1005                                 .SBTTL  IF BIT00 IS SET IT IS POSSIBLE WE ARE ADDRESSING THE WRONG
1006                                 .SBTTL  REGISTER
1007                                 ;;*****************************************************************
```

```
1008 003156  000004                              SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     003160  003170                              40$                     ;TEST START LOCATION
     003162  003170                              1$                      ;LOOP ON ERROR START LOCATION
     003164  000000                              0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     003166  003176                              25$                     ;LOOP ON ERROR END LOCATION
     003170                              40$:
1009 003170  012737  000001  177744      1$:     MOV #1,CME              ;WRITE 1 INTO BIT00
1010
     003176  000240                      25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     003200  000240                              NOP                     ;FOR  LOOP ON ERROR

1011 003202  032737  000001  177744              BIT #1,CME              ;CHECK FOR 0
1012 003210  001403                              BEQ 10$                 ;PASS;NEXT TEST
1013
     003212  104000                              ERROR                           ;ERROR
                                                                                 ;-----
     003214  003212                              .-2
1014                                                                     ;CACHE REGISTER RESPONSE TESTS
1015                                                                     ;UNUSED CME BIT00 READ AS 1
1016                                                                     ;POSSIBLE REG. ADDRESS ERROR
1017
1018 003216  000000                              0
1019 003220  000240                      10$:    NOP             ;END OF TEST
1020
1021
1022 003222  005237  001464              T7:     INC $TESTN              ;UPDATE TEST ID
                                        ;;*****************************************************************
                                        .SBTTL
                                        .SBTTL TEST 7
                                        .SBTTL
1023                                    ;;*****************************************************************
1024                                    .SBTTL  ASSURING BIT00(DCPI) READS AS A 1 AND TESTING ADDRESS
1025                                    .SBTTL  SELECT LOGIC BY WRITING 1 INTO BIT00 OF CCR AND THEN
1026                                    .SBTTL  READING A 1.IF BIT00 READS AS 0 POSSIBLE ADDRESSING
1027                                    .SBTTL  WRONG REGISTER OR CCR REGISTER/DATA PATH  ARE BAD.
1028                                    .SBTTL
1029                                    ;;*****************************************************************
1030 003226  000004                              SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
     003230  003240                              40$                     ;TEST START LOCATION
     003232  003240                              1$                      ;LOOP ON ERROR START LOCATION
     003234  000000                              0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     003236  003246                              25$                     ;LOOP ON ERROR END LOCATION
     003240                              40$:
1031 003240  032737  000001  177746      1$:     BIT #1,CCR              ;CHECK BIT00 FOR 1
1032
     003246  000240                      25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     003250  000240                              NOP                     ;FOR  LOOP ON ERROR

1033 003252  001003                              BNE 10$                 ;PASS;NXT TEST
1034
     003254  104000                              ERROR                           ;ERROR
                                                                                 ;-----
     003256  003254                              .-2
1035                                                                     ;CACHE REGISTER RESPONSE TESTS
1036                                                                     ;WROTE 1 INTO BIT00 CCR; READ 0
```

```
1037
1038 003260  000000                              0
1039 003262  000240                    10$:      NOP                ;END OF TEST
1040
1041
1042                                .SBTTL *
1043                                .SBTTL
1044                                .SBTTL *                        CACHE CONTROL REGISTER DATA TEST (CCR)
1045                                .SBTTL
1046                                .SBTTL *
1047
1048
1049 003264  005237  001464         T10:              INC $TESTN                ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 10
                                    .SBTTL
1050                                ;;*****************************************************************
1051                                .SBTTL  VERIFY THAT CCR BIT12(VCIP) READS AS A 0, SINCE A CLEARING
1052                                .SBTTL  OF VALID STORE SHOULD NOT BE HAPPENING AT THIS TIME
1053                                .SBTTL
1054                                ;;*****************************************************************
1055 003270  000004                              SCPCND                    ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                          ;ERROR/LOOP ON TEST
      003272  003302                              40$                       ;TEST START LOCATION
      003274  003302                              1$                        ;LOOP ON ERROR START LOCATION
      003276  000000                              0                         ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      003300  003310                              25$                       ;LOOP ON ERROR END LOCATION
      003302                              40$:
1056 003302  032737  010000  177746       1$:      BIT #BIT12,CCR            ;CHECK FOR 0
1057
      003310  000240                      25$:     NOP                       ;INSTRUCTION 'JMP 1$' PLACED HERE
      003312  000240                               NOP                       ;FOR  LOOP ON ERROR

1058 003314  001403                              BEQ 10$                   ;PASS
1059
      003316  104000                              ERROR                             ;ERROR
                                                                                    ;-----
      003320  003316                              .-2
1060                                                                      ;CCR DATA TEST
1061                                                                      ;READ 1 FROM CCR BIT12. A CLEARING OF
1062                                                                      ;VALID STORE AT THIS TIME SHOULD NOT
1063                                                                      ;BE INDICATED
1064 003322  000000                              0
1065 003324  000240                    10$:      NOP                       ;NXT TEST
1066
1067
1068
1069 003326  005237  001464         T11:              INC $TESTN                ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 11
                                    .SBTTL
1070                                ;;*****************************************************************
1071                                .SBTTL  WRITE ZERO INTO CCR BIT00 THEN READ CCR
1072                                .SBTTL  IF CCR IS READ AS ONE THEN CACHE CCR REGISTER MAY BE BAD
1073                                .SBTTL  OR CACHE REGISTER DATA PATH COULD BE IN ERROR
```

```
1074                                    ;;*****************************************************************
1075 003332  000004                     SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
     003334  003344                     40$                     ;TEST START LOCATION
     003336  003352                     1$                      ;LOOP ON ERROR START LOCATION
     003340  000000                     0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     003342  003364                     25$                     ;LOOP ON ERROR END LOCATION
     003344                     40$:
1076 003344  012737  001415  177746     MOV #OFF+BIT08,CCR      ;DISABLE AND FLUSH CACHE
1077 003352  042737  000001  177746     1$: BIC #BIT00,CCR      ;WRITE 0
1078 003360  013700  177746             MOV CCR,R0              ;SAVE CCR CONTENTS
1079
     003364  000240                     25$: NOP                ;INSTRUCTION 'JMP 1$' PLACED HERE
     003366  000240                     NOP                     ;FOR  LOOP ON ERROR

1080 003370  032700  000001             BIT #BIT00,R0           ;CHECK FOR 0
1081 003374  001403                     BEQ 10$                 ;PASS; NXT TEST
1082
     003376  104000                     ERROR                           ;ERROR
                                                                        ;-----
     003400  003376                     .-2
1083                                                            ;CCR DATA TEST
1084                                                            ;WROTE 0 INTO BIT00 CCR; READ 1
1085
1086 003402  000000                     0
1087 003404  000240                     10$: NOP                ;END OF TEST
1088
1089
1090 003406  005237  001464     T12:    INC $TESTN              ;UPDATE TEST ID
                                        ;;*****************************************************************
                                        .SBTTL
                                        .SBTTL TEST 12
                                        .SBTTL
1091                                    ;;*****************************************************************
1092                                    .SBTTL  WRITE ZERO INTO CCR BIT02(FMLO) THEN READ CCR
1093                                    .SBTTL  IF BIT02 IS READ AS ONE THEN CCR REGISTER MAY BE BAD
1094                                    .SBTTL  OR CACHE REGISTER DATA PATH MAY BE AT FAULT
1095                                    ;;*****************************************************************
1096 003412  000004                     SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
     003414  003424                     40$                     ;TEST START LOCATION
     003416  070000                     1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     003420  000000                     0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     003422  070006                     25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     003424  012737  001015  177746     40$: MOV #OFF,CCR       ;DISABLE CACHE
     003432  004437  002352             JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     003436  003502                     10$+2                   ;ADDRESS OF START OF NEXT TEST

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

1097 003440  042737  000004  177746     1$:  BIC #BIT02,CCR     ;WRITE 0
1098
     003446  000240                     25$: NOP                ;INSTRUCTION 'JMP 1$' PLACED HERE
     003450  000240                     NOP                     ;FOR  LOOP ON ERROR

1099 003452  013701  177746             MOV CCR,R1              ;SAVE CCR CONTENTS
```

```
1100 003456  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
1101 003464  032701  000004                  BIT #BIT02,R1           ;CHECK FOR 0
1102 003470  001403                          BEQ 10$                 ;PASS; NXT TEST
1103
     003472  104000                          ERROR                           ;ERROR
                                                                              ;-----
     003474  003472                          .-2
1104                                                                 ;CCR DATA TEST
1105                                                                 ;WROTE 0 INTO CCR BIT02; READ 1
1106
1107 003476  000000                          0
1108 003500  000240                  10$:    NOP             ;END OF TEST
1109
1110
1111 003502  005237  001464          T13:    INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 13
                                     .SBTTL
1112                                 ;;*****************************************************************
1113                                 .SBTTL  WRITE ONE INTO CCR BIT02(FMLO) AND ASSURE THAT IT READS  1.
1114                                 .SBTTL  IF READS BACK AS 0 THEN CCR MAY BE BAD OR CACE DATA PATH
1115                                 .SBTTL  IS AT FAULT
1116                                 ;;*****************************************************************
1117 003506  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     003510  003520                          40$                     ;TEST START LOCATION
     003512  003520                          1$                      ;LOOP ON ERROR START LOCATION
     003514  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     003516  003526                          25$                     ;LOOP ON ERROR END LOCATION
     003520                       40$:
1118 003520  052737  000004  177746    1$:   BIS #FMLO,CCR           ;
1119
     003526  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     003530  000240                          NOP                     ;FOR  LOOP ON ERROR

1120 003532  032737  000004  177746          BIT #BIT02,CCR          ;CHECK FOR 1
1121 003540  001003                          BNE 10$                 ;PASS
1122
     003542  104000                          ERROR                           ;ERROR
                                                                              ;-----
     003544  003542                          .-2
1123                                                                 ;CCR DATA TEST
1124                                                                 ;WROTE 1 INTO CCR BIT02; READ 0
1125
1126 003546  000000                          0
1127 003550  000240                  10$:    NOP             ;END OF TEST
1128
1129
1130
1131
1132 003552  005237  001464          T14:    INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 14
                                     .SBTTL
1133                                 ;;*****************************************************************
```

```
1134                                    .SBTTL  WRITE ZERO INTO CCR BIT03(FMHI) THEN READ CCR
1135                                    .SBTTL  IF BIT03 READ BACK AS ONE THEN CCR REGISTER BIT MAY BE BAD
1136                                    .SBTTL  OR CACHE REGISTER DATA PATH MAY BE AT FAULT
1137                                    ;;*****************************************************************
1138 003556  000004                                   SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                               ;ERROR/LOOP ON TEST
     003560  003570                                   40$                     ;TEST START LOCATION
     003562  060000                                   1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
     003564  000000                                   0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     003566  060012                                   25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
     003570  012737  001015  177746          40$:     MOV #OFF,CCR            ;DISABLE CACHE
     003576  004437  002324                           JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
     003602  003646                                   10$+2                   ;ADDRESS OF START OF NEXT TEST

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

1139 003604  042737  000010  177746          1$:      BIC #BIT03,CCR          ;WRITE 0
1140 003612  013700  177746                           MOV CCR,R0              ;SAVE CONTENTS OF CCR
1141
     003616  000240                           25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     003620  000240                                    NOP                     ;FOR  LOOP ON ERROR

1142 003622  012737  001015  177746                   MOV #OFF,CCR            ;;DISABLE CACHE
1143 003630  032700  000010                           BIT #BIT03,R0           ;CHECK FOR 0
1144 003634  001403                                   BEQ 10$                 ;PASS
1145
     003636  104000                                   ERROR                           ;ERROR
                                                                                       ;-----
     003640  003636                                   .-2
1146                                                                           ;CCR DATA TEST
1147                                                                           ;WROTE 0 INTO CCR BIT03; READ 1
1148
1149 003642  000000                                   0
1150 003644  000240                           10$:     NOP             ;END OF TEST
1151
1152
1153
1154 003646  005237  001464          T15:             INC $TESTN              ;UPDATE TEST ID
                                        ;;*****************************************************************
                                        .SBTTL
                                        .SBTTL TEST 15
                                        .SBTTL
1155                                    ;;*****************************************************************
1156                                    .SBTTL  WRITE 1 INTO CCR BIT03(FMHI) AND ASSURE IT READS 1.
1157                                    .SBTTL  IF CCR BIT03 READ AS ZERO THEN CCR REGISTER BIT MAY BE BAD
1158                                    .SBTTL  OR CACHE REGISTER DATA PATH MAY BE AT FAULT
1159                                    ;;*****************************************************************
1160 003652  000004                                   SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                               ;ERROR/LOOP ON TEST
     003654  003664                                   40$                     ;TEST START LOCATION
     003656  003664                                   1$                      ;LOOP ON ERROR START LOCATION
     003660  000000                                   0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     003662  003672                                   25$                     ;LOOP ON ERROR END LOCATION
     003664                                  40$:
1161 003664  052737  000010  177746          1$:      BIS #FMHI,CCR           ;
1162
```

```
                003672  000240                          25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
                003674  000240                                  NOP                     ;FOR  LOOP ON ERROR

1163            003676  032737  000010  177746                  BIT #BIT03,CCR          ;CHECK FOR 1
1164            003704  001003                                  BNE 10$                 ;PASS
1165
                003706  104000                                  ERROR                           ;ERROR
                                                                                        ;-----
                003710  003706                                  .-2
1166                                                            ;CCR DATA TEST
1167                                                            ;WROTE 1 INTO CCR BIT03; READ 0
1168
1169            003712  000000                                  0
1170            003714  000240                          10$:    NOP             ;END OF TEST
1171
1172
1173            003716  005237  001464          T16:            INC $TESTN              ;UPDATE TEST ID
                                                ;;**************************************************************
                                                .SBTTL
                                                .SBTTL TEST 16
                                                .SBTTL
1174                                            ;;**************************************************************
1175                                            .SBTTL  WRITE 0 INTO CCR BIT06(WWPD) THEN READ CCR
1176                                            .SBTTL  IF BIT06 READ AS ONE THEN CCR REGISTER BIT MAY BE BAD
1177                                            .SBTTL  OR CACHE REGISTER DATA PATH MAY BE AT FAULT
1178                                            ;;**************************************************************
1179            003722  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                        ;ERROR/LOOP ON TEST
                003724  003734                                  40$                     ;TEST START LOCATION
                003726  003734                                  1$                      ;LOOP ON ERROR START LOCATION
                003730  000000                                  0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
                003732  003742                                  25$                     ;LOOP ON ERROR END LOCATION
                003734                                  40$:
1180            003734  042737  000100  177746          1$:     BIC #BIT06,CCR          ;WRITE 0
1181
                003742  000240                          25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
                003744  000240                                  NOP                     ;FOR  LOOP ON ERROR

1182            003746  032737  000100  177746                  BIT #BIT06,CCR          ;CHECK FOR 0
1183            003754  001403                                  BEQ 10$                 ;PASS
1184
                003756  104000                                  ERROR                           ;ERROR
                                                                                        ;-----
                003760  003756                                  .-2
1185                                                            ;CCR DATA TEST
1186                                                            ;WROTE 0 INTO CCR BIT06; READ 1
1187
1188            003762  000000                                  0
1189            003764  000240                          10$:    NOP             ;END OF TEST
1190
1191
1192
1193
1194            003766  005237  001464          T17:            INC $TESTN              ;UPDATE TEST ID
                                                ;;**************************************************************
                                                .SBTTL
                                                .SBTTL TEST 17
```

```
                                .SBTTL
                                ;;*****************************************************************
                                .SBTTL  WRITE ZERO INTO CCR BIT07(PEA) THEN READ CCR
                                .SBTTL  IF CCR BIT07 READ AS ONE THEN CCR REGISTER BIT MAY BE BAD
                                .SBTTL  OR CACHE REGISTER DATA PATH MAY BE AT FAULT
                                ;;*****************************************************************
004372  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
004374  004004                          40$                     ;TEST START LOCATION
004376  004004                          1$                      ;LOOP ON ERROR START LOCATION
004400  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
004402  004412                          25$                     ;LOOP ON ERROR END LOCATION
004404                          40$:
004404  042737  000200  177746    1$:   BIC #BIT07,CCR          ;WRITE 0

004412  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
004414  000240                          NOP                     ;FOR  LOOP ON ERROR

004416  032737  000200  177746          BIT #BIT07,CCR          ;CHECK FOR 0
004424  001403                          BEQ 10$                 ;PASS

004426  104000                          ERROR                           ;ERROR
                                                                        ;-----
004430  004426                          .-2
                                                                ;CCR DATA TEST
                                                                ;WROTE 0 INTO CCR BIT07; READ 1

004432  000000                          0
004434  000240                  10$:    NOP             ;END OF TEST

004436  005257  001464          T20:    INC $TESTN              ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 20
                                .SBTTL
                                ;;*****************************************************************
                                .SBTTL  WRITE ONE INTO CCR BIT07 THEN READ CCR
                                .SBTTL  IF CCR BIT07 READ AS ZERO THEN CCR REGISTER BIT MAY BE BAD
                                .SBTTL  OR CACHE REGISTER DATA PATH MAY BE AT FAULT
                                ;;*****************************************************************
004442  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
004444  004454                          40$                     ;TEST START LOCATION
004446  004454                          1$                      ;LOOP ON ERROR START LOCATION
004450  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
004452  004466                          25$                     ;LOOP ON ERROR END LOCATION
004454                          40$:
004454  052737  000200  177746    1$:   BIS #BIT07,CCR          ;WRITE 1
004462  013700  177746                  MOV CCR,R0              ;SAVE CCR CONTENTS

004466  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
004470  000240                          NOP                     ;FOR  LOOP ON ERROR

004472  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
004500  032700  000200                  BIT #BIT07,R0           ;CHECK FOR 1
004504  001003                          BNE 10$                 ;PASS
```

```
1226
     004106  104000                          ERROR                       ;ERROR
                                                                         ;-----
     004110  004106                          .-2
1227                                                    ;CCR DATA TEST
1228                                                    ;WROTE 1 INTO CCR BIT07; READ 0
1229
1230 004112  000000                          0
1231 004114  000240                  10$:    NOP                 ;END OF TEST
1232
1233
```

```
1235 004116  005237  001464          T21:        INC $TESTN              ;UPDATE TEST ID
                                     ;;*********************************************************************
                                     .SBTTL
                                     .SBTTL TEST 21
                                     .SBTTL
1236                                 ;;*********************************************************************
1237                                 .SBTTL          WRITE ZERO INTO CCR BIT08(FC) THEN READ CCR
1238                                 .SBTTL  IF CCR BIT08 READ AS ONE THEN CCR REGISTER BIT MAY BE BAD
1239                                 .SBTTL  OR CACHE REGISTER DATA PATH MAY BE AT FAULT
1240                                 ;;*********************************************************************
1241 004122  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     004124  004134                        40$                     ;TEST START LOCATION
     004126  004134                        1$                      ;LOOP ON ERROR START LOCATION
     004130  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004132  004142                        25$                     ;LOOP ON ERROR END LOCATION
     004134                          40$:
1242 004134  042737  000400  177746  1$:   BIC #BIT08,CCR           ;WRITE 0
1243
     004142  000240                  25$:  NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004144  000240                        NOP                     ;FOR  LOOP ON ERROR

1244 004146  032737  000400  177746        BIT #BIT08,CCR          ;CHECK FOR 0
1245 004154  001401                        BEQ 10$                 ;PASS
1246                                                                 ;CCR DATA TEST
1247                                                                 ;WROTE 0 INTO CCR BIT08; READ 1
1248
1249 004156  000000                        0
1250 004160  000240                  10$:  NOP             ;END OF TEST
1251
1252
1253 004162  005237  001464          T22:        INC $TESTN              ;UPDATE TEST ID
                                     ;;*********************************************************************
                                     .SBTTL
                                     .SBTTL TEST 22
                                     .SBTTL
1254                                 ;;*********************************************************************
1255                                 .SBTTL  WRITE 1 INTO CCR BIT09(UCB) AND ASSURE IT READS 1.
1256                                 .SBTTL  IF CCR BIT09 READ AS ZERO THEN CCR REGISTER BIT MAY BE BAD
1257                                 .SBTTL  OR CACHE REGISTER DATA PATH MAY BE AT FAULT
1258                                 ;;*********************************************************************
1259 004166  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     004170  004200                        40$                     ;TEST START LOCATION
     004172  004200                        1$                      ;LOOP ON ERROR START LOCATION
     004174  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004176  004206                        25$                     ;LOOP ON ERROR END LOCATION
     004200                          40$:
1260 004200  052737  001000  177746  1$:   BIS #UCB,CCR            ;
1261
     004206  000240                  25$:  NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004210  000240                        NOP                     ;FOR  LOOP ON ERROR

1262 004212  032737  001000  177746        BIT #BIT09,CCR          ;CHECK FOR 1
1263 004220  001003                        BNE 10$                 ;PASS
1264
     004222  104000                        ERROR                           ;ERROR
```

```
                                                                    ;-----
     004224  004222                                .-2
1265                                                                ;CCR DATA TEST
1266                                                                ;WROTE 1 INTO CCR BIT09; READ 0
1267
1268 004226  000000                                0
1269 004230  000240                          10$:   NOP             ;END OF TEST
1270
1271 004232  005237  001464           T23:        INC $TESTN                  ;UPDATE TEST ID
                                      ;;*************************************************************************
                                      .SBTTL
                                      .SBTTL TEST 23
                                      .SBTTL
1272                                  ;;*************************************************************************
1273                                  .SBTTL  WRITE ZERO INTO CCR BIT10(WWPT) AND READ 0
1274                                  .SBTTL
1275                                  ;;*************************************************************************
1276 004236  000004                                SCPCND                      ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                              ;ERROR/LOOP ON TEST
     004240  004250                                40$                         ;TEST START LOCATION
     004242  004250                                1$                          ;LOOP ON ERROR START LOCATION
     004244  000000                                0                           ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004246  004256                                25$                         ;LOOP ON ERROR END LOCATION
     004250                                  40$:
1277 004250  042737  002000  177746          1$:   BIC #BIT10,CCR              ;WRITE 0
1278
     004256  000240                          25$:   NOP                        ;INSTRUCTION 'JMP 1$' PLACED HERE
     004260  000240                                 NOP                        ;FOR  LOOP ON ERROR

1279 004262  032737  002000  177746                BIT #BIT10,CCR             ;CHECK FOR 0
1280 004270  001403                                BEQ 10$                    ;PASS
1281
     004272  104000                                ERROR                              ;ERROR
                                                                                       ;-----
     004274  004272                                .-2
1282                                                                ;CCR DATA TEST
1283                                                                ;WROTE 0 INTO CCR BIT 10; READ 1
1284
1285 004276  000000                                0
1286 004300  000240                          10$:   NOP             ;END OF TEST
1287
1288
1289                                  .SBTTL *
1290                                  .SBTTL
1291                                  .SBTTL *                CACHE CONTROL CONTROL REGISTER UNUSED BIT TEST(CCR)
1292                                  .SBTTL
1293                                  .SBTTL *
1294
1295
1296 004302  005237  001464           T24:        INC $TESTN                  ;UPDATE TEST ID
                                      ;;*************************************************************************
                                      .SBTTL
                                      .SBTTL TEST 24
                                      .SBTTL
1297                                  ;;*************************************************************************
1298                                  .SBTTL  WRITE INTO UNUSED CCR REGISTER BIT01 THEN READ CCR
1299                                  .SBTTL  IF CCR BIT01 READ AS ONE THEN CACHE DATA PATH
```

```
1300                                    .SBTTL
1301                                    ;;*****************************************************************
1302 004306  000004                     SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                 ;ERROR/LOOP ON TEST
     004310  004320                     40$                     ;TEST START LOCATION
     004312  004320                     1$                      ;LOOP ON ERROR START LOCATION
     004314  000000                     0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004316  004326                     25$                     ;LOOP ON ERROR END LOCATION
     004320                          40$:
1303 004320  052737  000002  177746   1$:     BIS #BIT01,CCR          ;WRITE 1 INTO UNUSED BIT
1304
     004326  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004330  000240                          NOP                     ;FOR  LOOP ON ERROR

1305 004332  032737  000002  177746         BIT #BIT01,CCR          ;CHECK THAT BIT READS 0
1306 004340  001403                         BEQ 10$                 ;PASS
1307
     004342  104000                         ERROR                           ;ERROR
                                                                             ;-----
     004344  004342                         .-2
1308                                                                 ;CCR UNUSED BIT TEST
1309                                                                 ;READ 1 FROM UNUSED CCR BIT01
1310                                                                 ;SHOULD READ 0
1311
1312 004346  000000                         0
1313 004350  000240                  10$:    NOP             ;END OF TEST
1314
1315
1316
1317 004352  005237  001464          T25:    INC $TESTN              ;UPDATE TEST ID
                                        ;;*****************************************************************
                                        .SBTTL
                                        .SBTTL TEST 25
                                        .SBTTL
1318                                    ;;*****************************************************************
1319                                    .SBTTL  WRITE ONE INTO UNUSED CCR BIT04 THEN READ CCR
1320                                    .SBTTL  IF CCR BIT04 READ AS ONE THEN CACHE REGISTER DATA PATH ERROR
1321                                    .SBTTL
1322                                    ;;*****************************************************************
1323
1324 004356  000004                     SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                 ;ERROR/LOOP ON TEST
     004360  004370                     40$                     ;TEST START LOCATION
     004362  004370                     1$                      ;LOOP ON ERROR START LOCATION
     004364  000000                     0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     004366  004376                     25$                     ;LOOP ON ERROR END LOCATION
     004370                          40$:
1325 004370  052737  000020  177746   1$:     BIS #BIT04,CCR          ;WRITE 1 INTO UNUSED BIT
1326
     004376  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     004400  000240                          NOP                     ;FOR  LOOP ON ERROR

1327 004402  032737  000020  177746         BIT #BIT04,CCR          ;CHECK THAT BIT READS 0
1328 004410  001403                         BEQ 10$                 ;PASS
1329
     004412  104000                         ERROR                           ;ERROR
                                                                             ;-----
```

```
                004414  004412                          .-2
1330                                                    ;CCR UNUSED BIT TEST
1331                                                    ;READ 1 FROM UNUSED CCR BIT04
1332                                                    ;SHOULD READ 0
1333
1334            004416  000000                          0
1335            004420  000240                  10$:    NOP             ;END OF TEST
1336
1337
1338            004422  005237  001464         T26:     INC $TESTN              ;UPDATE TEST ID
                                               ;;*****************************************************************
                                               .SBTTL
                                               .SBTTL TEST 26
                                               .SBTTL
1339                                           ;;*****************************************************************
1340                                           .SBTTL  WRITE ONE INTO UNUSED CCR BIT05 THEN READ CCR
1341                                           .SBTTL  IF CCR BIT05 READ AS ONE THEN CACHE REGISTER DATA PATH ERROR
1342                                           .SBTTL
1343                                           ;;*****************************************************************
1344            004426  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                ;ERROR/LOOP ON TEST
                004430  004440                          40$                     ;TEST START LOCATION
                004432  004440                          1$                      ;LOOP ON ERROR START LOCATION
                004434  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
                004436  004446                          25$                     ;LOOP ON ERROR END LOCATION
                004440                          40$:
1345            004440  052737  000040  177746    1$:     BIS #BIT05,CCR          ;WRITE 1 INTO UNUSED BIT
1346
                004446  000240                  25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HER'
                004450  000240                          NOP                     ;FOR  LOOP ON ERROR

1347            004452  032737  000040  177746          BIT #BIT05,CCR          ;CHECK THAT BIT READS 0
1348            004460  001403                          BEQ 10$                 ;PASS
1349
                004462  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                004464  004462                          .-2
1350                                                    ;CCR UNUSED BIT TEST
1351                                                    ;READ 1 FROM UNUSED CCR BIT05
1352                                                    ;SHOULD READ 0
1353
1354            004466  000000                          0
1355            004470  000240                  10$:    NOP             ;END OF TEST
1356
1357
1358            004472  005237  001464         T27:     INC "$TESTN             ;UPDATE TEST ID
                                               ;;*****************************************************************
                                               .SBTTL
                                               .SBTTL TEST 27
                                               .SBTTL
1359                                           ;;*****************************************************************
1360                                           .SBTTL  WRITE ONE INTO UNUSED CCR BIT08 THEN READ CCR
1361                                           .SBTTL  IF CCR BIT08 READ AS ONE THEN CACHE REGISTER DATA PATH ERROR
1362                                           .SBTTL
1363                                           ;;*****************************************************************
1364            004476  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                ;ERROR/LOOP ON TEST
```

```
                004500  004510                          40$                     ;TEST START LOCATION
                004502  004510                          1$                      ;LOOP ON ERROR START LOCATION
                004504  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
                004506  004516                          25$                     ;LOOP ON ERROR END LOCATION
                004510                          40$:
1365            004510  052737  000400  177746  1$:     BIS #BIT08,CCR          ;WRITE 1 INTO UNUSED BIT
1366
                004516  000240                  25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
                004520  000240                          NOP                     ;FOR  LOOP ON ERROR

1367            004522  032737  000400  177746          BIT #BIT08,CCR          ;CHECK THAT BIT READS 0
1368            004530  001403                          BEQ 10$                 ;PASS
1369
                004532  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                004534  004532                          .-2
1370                                                                            ;CCR UNUSED BIT TEST
1371                                                                            ;READ 1 FROM UNUSED CCR BIT08
1372                                                                            ;SHOULD READ 0
1373
1374            004536  000000                          0
1375            004540  000240                  10$:     NOP             ;END OF TEST
1376
1377
1378            004542  005237  001464          T30:    INC $TESTN              ;UPDATE TEST ID
                                                ;;**********************************************************************
                                                .SBTTL
                                                .SBTTL TEST 30
                                                .SBTTL
1379                                            ;;**********************************************************************
1380                                            .SBTTL  WRITE ONE INTO UNUSED CCR BIT11 THEN READ CCR
1381                                            .SBTTL  IF CCR BIT11 READ AS ONE THEN CACHE REGISTER DATA PATH ERROR
1382                                            .SBTTL
1383                                            ;;**********************************************************************
1384            004546  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                ;ERROR/LOOP ON TEST
                004550  004560                          40$                     ;TEST START LOCATION
                004552  004560                          1$                      ;LOOP ON ERROR START LOCATION
                004554  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
                004556  004566                          25$                     ;LOOP ON ERROR END LOCATION
                004560                          40$:
1385            004560  052737  004000  177746  1$:     BIS #BIT11,CCR          ;WRITE 1 INTO UNUSED BIT
1386
                004566  000240                  25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
                004570  000240                          NOP                     ;FOR  LOOP ON ERROR

1387            004572  032737  004000  177746          BIT #BIT11,CCR          ;CHECK THAT BIT READS 0
1388            004600  001403                          BEQ 10$                 ;PASS
1389
                004602  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                004604  004602                          .-2
1390                                                                            ;CCR UNUSED BIT TEST
1391                                                                            ;READ 1 FROM UNUSED CCR BIT11
1392                                                                            ;SHOULD READ 0
1393
1394            004606  000000                          0
```

```
1395 004610  000240                        10$:    NOP                ;END OF TEST
1396 004612  005237  001464          T31:          INC $TESTN         ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 31
                                     .SBTTL
1397                                 ;;*****************************************************************
1398                                 ;       WRITE ONE INTO UNUSED CCR BIT14 THEN READ CCR
1399                                 .SBTTL  IF CCR BIT14 READ AS ONE THEN CACHE REGISTER DATA PATH ERROR
1400                                 .SBTTL
1401                                 ;;*****************************************************************
1402 004616  000004                        SCPCND             ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
      004620  004630                       40$                ;TEST START LOCATION
      004622  004630                       1$                 ;LOOP ON ERROR START LOCATION
      004624  000000                       0                  ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      004626  004636                       25$                ;LOOP ON ERROR END LOCATION
      004630                         40$:
1403 004630  052737  040000  177746   1$:    BIS #BIT14,CCR     ;WRITE 1 INTO UNUSED BIT
1404
      004636  000240                 25$:    NOP                ;INSTRUCTION 'JMP 1$' PLACED HERE
      004640  000240                        NOP                ;FOR  LOOP ON ERROR

1405 004642  032737  040000  177746         BIT #BIT14,CCR     ;CHECK THAT BIT READS 0
1406 004650  001403                        BEQ 10$            ;PASS
1407
      004652  104000                        ERROR                      ;ERROR
                                                                       ;-----
      004654  004652                       .-2
1408                                                            ;CCR UNUSED BIT TEST
1409                                                            ;READ 1 FROM UNUSED CCR BIT14
1410                                                            ;SHOULD READ 0
1411
1412 004656  000000                        0
1413 004660  000240                  10$:  NOP                ;END OF TEST
1414
1415
1416 004662  005237  001464          T32:          INC $TESTN         ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 32
                                     .SBTTL
1417                                 ;;*****************************************************************
1418                                 .SBTTL  WRITE 1 INTO UNUSED CCR BIT15 THEN READ CCR
1419                                 .SBTTL  IF CCR BIT15 READ AS ONE THEN CACHE REGISTER DATA PATH ERROR
1420                                 .SBTTL
1421                                 ;;*****************************************************************
1422 004666  000004                        SCPCND             ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
      004670  004700                       40$                ;TEST START LOCATION
      004672  004700                       1$                 ;LOOP ON ERROR START LOCATION
      004674  000000                       0                  ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      004676  004706                       25$                ;LOOP ON ERROR END LOCATION
      004700                         40$:
1423 004700  052737  100000  177746   1$:    BIS #BIT15,CCR     ;WRITE 1 INTO UNUSED BIT
1424
      004706  000240                 25$:    NOP                ;INSTRUCTION 'JMP 1$' PLACED HERE
```

```
      004710  000240                          NOP                     ;FOR  LOOP ON ERROR

1425  004712  032737  100000  177746          BIT #BIT15,CCR          ;CHECK THAT BIT READS 0
1426  004720  001403                          BEQ 10$                 ;PASS
1427
      004722  104000                          ERROR                           ;ERROR
                                                                              ;-----
      004724  004722                          .-2
1428                                                                  ;CCR UNUSED BIT TEST
1429                                                                  ;READ 1 FROM UNUSED CCR BIT15
1430                                                                  ;SHOULD READ 0
1431
1432  004726  000000                          0
1433  004730  000240                  10$:    NOP             ;END OF TEST
1434
1435
1436                           .SBTTL *
1437                           .SBTTL
1438                           .SBTTL *                CACHE MEMORY ERROR REGISTER UNUSED BIT TEST (CME)
1439                           .SBTTL
1440                           .SBTTL *
1441
1442
1443  004732  005237  001464  T33:            INC $TESTN              ;UPDATE TEST ID
                               ;;*************************************************************************
                               .SBTTL
                               .SBTTL TEST 33
                               .SBTTL
1444                           ;;*************************************************************************
1445                           .SBTTL  ATTEMPT WRITE 1 INTO ALL UNUSED BITS OF CME.
1446                           .SBTTL  ALL BITS SHOULD READ 0.
1447                           .SBTTL
1448                           ;;*************************************************************************
1449
1450  004736  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                      ;ERROR/LOOP ON TEST
      004740  004750                          40$                     ;TEST START LOCATION
      004742  004750                          1$                      ;LOOP ON ERROR START LOCATION
      004744  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      004746  004756                          25$                     ;LOOP ON ERROR END LOCATION
      004750                          40$:
1451  004750  052737  000001  177744  1$:     BIS #BIT00,CME          ;WRITE 1 INTO BIT00
1452
      004756  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      004760  000240                          NOP                     ;FOR  LOOP ON ERROR

1453  004762  032737  000001  177744          BIT #BIT00,CME          ;CHECK FOR 0
1454  004770  001403                          BEQ 10$         ;PASS
1455
      004772  104000                          ERROR                           ;ERROR
                                                                              ;-----
      004774  004772                          .-2
1456                                                                  ;CME UNUSED BIT TEST
1457                                                                  ;READ 1 FROM UNUSED CME BIT00
1458  004776  000000                          0
1459  005000  000240                  10$:    NOP                     ;END OF TEST
1460  005002  005237  001464          T34:    INC $TESTN              ;UPDATE TEST ID
```

```
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 34
                                .SBTTL
 1461 005006  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
      005010  005020                        40$                     ;TEST START LOCATION
      005012  005020                        1$                      ;LOOP ON ERROR START LOCATION
      005014  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      005016  005026                        25$                     ;LOOP ON ERROR END LOCATION
      005020                          40$:
 1462 005020  052737  000002  177744    1$:     BIS #BIT01,CME          ;WRITE 1 INTO BIT01
 1463
      005026  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      005030  000240                            NOP                     ;FOR  LOOP ON ERROR

 1464 005032  032737  000002  177744            BIT #BIT01,CME          ;CHECK FOR 0
 1465 005040  001403                            BEQ 10$         ;PASS
 1466
      005042  104000                            ERROR                           ;ERROR
                                                                                ;-----
      005044  005042                            .-2
 1467                                                               ;CME UNUSED BIT TEST
 1468                                                               ;READ 1 FROM UNUSED CME BIT01
 1469 005046  000000                            0
 1470 005050  000240                      10$:  NOP                     ;END OF TEST
 1471 005052  005237  001464          T35:      INC $TESTN              ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 35
                                .SBTTL
 1472 005056  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
      005060  005070                        40$                     ;TEST START LOCATION
      005062  005070                        1$                      ;LOOP ON ERROR START LOCATION
      005064  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      005066  005076                        25$                     ;LOOP ON ERROR END LOCATION
      005070                          40$:
 1473 005070  052737  000004  177744    1$:     BIS #BIT02,CME          ;WRITE 1 INTO BIT02
 1474
      005076  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      005100  000240                            NOP                     ;FOR  LOOP ON ERROR

 1475 005102  032737  000004  177744            BIT #BIT02,CME          ;CHECK FOR 0
 1476 005110  001403                            BEQ 10$                 ;PASS
 1477
      005112  104000                            ERROR                           ;ERROR
                                                                                ;-----
      005114  005112                            .-2
 1478                                                               ;CME UNUSED BIT TEST
 1479                                                               ;READ 1 FROM UNUSED CME BIT02
 1480 005116  000000                            0
 1481 005120  000240                      10$:  NOP                     ;END OF TEST
 1482 005122  005237  001464          T36:      INC $TESTN              ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 36
```

```
                                .SBTTL
 1483 005126  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
      005130  005140                        40$                     ;TEST START LOCATION
      005132  005140                        1$                      ;LOOP ON ERROR START LOCATION
      005134  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      005136  005146                        25$                     ;LOOP ON ERROR END LOCATION
      005140                          40$:
 1484 005140  052737  000010  177744   1$:     BIS #BIT03,CME          ;WRITE 1 INTO BIT03
 1485
      005146  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      005150  000240                          NOP                     ;FOR  LOOP ON ERROR

 1486 005152  032737  000010  177744         BIT #BIT03,CME          ;CHECK FOR 0
 1487 005160  001403                          BEQ 10$                 ;PASS
 1488
      005162  104000                          ERROR                           ;ERROR
                                                                              ;-----
      005164  005162                          .-2
 1489                                                                ;CME UNUSED BIT TEST
 1490                                                                ;READ 1 FROM UNUSED CME BIT03
 1491 005166  000000                          0
 1492 005170  000240                    10$:  NOP                     ;END OF TEST
 1493 005172  005237  001464         T37:     INC $TESTN              ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 37
                                .SBTTL
 1494 005176  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
      005200  005210                        40$                     ;TEST START LOCATION
      005202  005210                        1$                      ;LOOP ON ERROR START LOCATION
      005204  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      005206  005216                        25$                     ;LOOP ON ERROR END LOCATION
      005210                          40$:
 1495 005210  052737  000020  177744   1$:     BIS #BIT04,CME          ;WRITE 1 INTO BIT04
 1496
      005216  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      005220  000240                          NOP                     ;FOR  LOOP ON ERROR

 1497 005222  032737  000020  177744         BIT #BIT04,CME          ;CHECK FOR 0
 1498 005230  001403                          BEQ 10$                 ;PASS
 1499
      005232  104000                          ERROR                           ;ERROR
                                                                              ;-----
      005234  005232                          .-2
 1500                                                                ;CME UNUSED BIT TEST
 1501                                                                ;READ 1 FROM UNUSED CME BIT04
 1502 005236  000000                          0
 1503 005240  000240                    10$:  NOP                     ;END OF TEST
 1504 005242  005237  001464         T40:     INC $TESTN              ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 40
                                .SBTTL
 1505 005246  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
```

```
                005250  005260                          40$                     ;TEST START LOCATION
                005252  005260                          1$                      ;LOOP ON ERROR START LOCATION
                005254  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
                005256  005266                          25$                     ;LOOP ON ERROR END LOCATION
                005260                          40$:
1506            005260  052737  000400  177744  1$:     BIS #BIT08,CME          ;WRITE 1 INTO BIT08
1507
                005266  000240                  25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
                005270  000240                          NOP                     ;FOR  LOOP ON ERROR

1508            005272  032737  000400  177744          BIT #BIT08,CME          ;CHECK FOR 0
1509            005300  001403                          BEQ 10$         ;PASS
1510
                005302  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                005304  005302                          .-2
1511                                                                            ;CME UNUSED BIT TEST
1512                                                                            ;READ 1 FROM UNUSED CME BIT08
1513            005306  000000                          0
1514            005310  000240                  10$:     NOP                     ;END OF TEST
1515            005312  005237  001464          T41:    INC $TESTN              ;UPDATE TEST ID
                                                ;;**************************************************************************
                                                .SBTTL
                                                .SBTTL TEST 41
                                                .SBTTL
1516            005316  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                ;ERROR/LOOP ON TEST
                005320  005330                          40$                     ;TEST START LOCATION
                005322  005330                          1$                      ;LOOP ON ERROR START LOCATION
                005324  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
                005326  005336                          25$                     ;LOOP ON ERROR END LOCATION
                005330                          40$:
1517            005330  052737  001000  177744  1$:     BIS #BIT09,CME          ;WRITE 1 INTO BIT09
1518
                005336  000240                  25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
                005340  000240                          NOP                     ;FOR  LOOP ON ERROR

1519            005342  032737  001000  177744          BIT #BIT09,CME          ;CHECK FOR 0
1520            005350  001403                          BEQ 10$                 ;PASS
1521
                005352  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                005354  005352                          .-2
1522                                                                            ;CME UNUSED BIT TEST
1523                                                                            ;READ 1 FROM UNUSED CME BIT09
1524            005356  000000                          0
1525            005360  000240                  10$:     NOP                     ;END OF TEST
1526            005362  005237  001464          T42:    INC $TESTN              ;UPDATE TEST ID
                                                ;;**************************************************************************
                                                .SBTTL
                                                .SBTTL TEST 42
                                                .SBTTL
1527            005366  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                ;ERROR/LOOP ON TEST
                005370  005400                          40$                     ;TEST START LOCATION
                005372  005400                          1$                      ;LOOP ON ERROR START LOCATION
                005374  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
```

```
                005376  005406                          25$                     ;LOOP ON ERROR END LOCATION
                005400                          40$:
1528            005400  052737  002000  177744  1$:     BIS #BIT10,CME          ;WRITE 1 INTO BIT10
1529
                005406  000240                  25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
                005410  000240                          NOP                     ;FOR  LOOP ON ERROR

1530            005412  032737  002000  177744          BIT #BIT10,CME          ;CHECK FOR 0
1531            005420  001403                          BEQ 10$                 ;PASS
1532
                005422  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                005424  005422                          .-2
1533                                                ;CME UNUSED BIT TEST
1534                                                                            ;READ 1 FROM UNUSED CME BIT10
1535            005426  000000                          0
1536            005430  000240                  10$:    NOP                     ;END OF TEST
1537            005432  005237  001464          T43:    INC $TESTN              ;UPDATE TEST ID
                                                ;;*****************************************************************
                                                .SBTTL
                                                .SBTTL TEST 43
                                                .SBTTL
1538            005436  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                ;ERROR/LOOP ON TEST
                005440  005450                          40$                     ;TEST START LOCATION
                005442  005450                          1$                      ;LOOP ON ERROR START LOCATION
                005444  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
                005446  005456                          25$                     ;LOOP ON ERROR END LOCATION
                005450                          40$:
1539            005450  052737  004000  177744  1$:     BIS #BIT11,CME          ;WRITE 1 INTO BIT11
1540
                005456  000240                  25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
                005460  000240                          NOP                     ;FOR  LOOP ON ERROR

1541            005462  032737  004000  177744          BIT #BIT11,CME          ;CHECK FOR 0
1542            005470  001403                          BEQ 10$         ;PASS
1543
                005472  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                005474  005472                          .-2
1544                                                                            ;CME UNUSED BIT TEST
1545                                                                            ;READ 1 FROM UNUSED CME BIT11
1546            005476  000000                          0
1547            005500  000240                  10$:    NOP                     ;END OF TEST
1548            005502  005237  001464          T44:    INC $TESTN              ;UPDATE TEST ID
                                                ;;*****************************************************************
                                                .SBTTL
                                                .SBTTL TEST 44
                                                .SBTTL
1549            005506  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                ;ERROR/LOOP ON TEST
                005510  005520                          40$                     ;TEST START LOCATION
                005512  005520                          1$                      ;LOOP ON ERROR START LOCATION
                005514  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
                005516  005526                          25$                     ;LOOP ON ERROR END LOCATION
                005520                          40$:
1550            005520  052737  010000  177744  1$:     BIS #BIT12,CME          ;WRITE 1 INTO BIT12
```

```
1551
     005526  000240                          25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005530  000240                                  NOP                     ;FOR  LOOP ON ERROR

1552 005532  032737  010000  177744                  BIT #BIT12,CME          ;CHECK FOR 0
1553 005540  001403                                  BEQ 10$         ;PASS
1554
     005542  104000                                  ERROR                           ;ERROR
                                                                                     ;-----
     005544  005542                                  .-2
1555                                                                         ;CME UNUSED BIT TEST
1556                                                                         ;READ 1 FROM UNUSED CME BIT12
1557 005546  000000                                  0
1558 005550  000240                          10$:    NOP                     ;END OF TEST
1559 005552  005237  001464              T45:        INC $TESTN              ;UPDATE TEST ID
                                         ;;**************************************************************
                                         .SBTTL
                                         .SBTTL TEST 45
                                         .SBTTL
1560 005556  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                             ;ERROR/LOOP ON TEST
     005560  005570                                  40$                     ;TEST START LOCATION
     005562  005570                                  1$                      ;LOOP ON ERROR START LOCATION
     005564  000000                                  0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     005566  005576                                  25$                     ;LOOP ON ERROR END LOCATION
     005570                                  40$:
1561 005570  052737  020000  177744          1$:     BIS #BIT13,CME          ;WRITE 1 INTO BIT13
1562
     005576  000240                          25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005600  000240                                  NOP                     ;FOR  LOOP ON ERROR

1563 005602  032737  020000  177744                  BIT #BIT13,CME          ;CHECK FOR 0
1564 005610  001403                                  BEQ 10$         ;PASS
1565
     005612  104000                                  ERROR                           ;ERROR
                                                                                     ;-----
     005614  005612                                  .-2
1566                                                                         ;CME UNUSED BIT TEST
1567                                                                         ;READ 1 FROM UNUSED CME BIT13
1568 005616  000000                                  0
1569 005620  000240                          10$:    NOP                     ;END OF TEST
1570 005622  005237  001464              T46:        INC $TESTN              ;UPDATE TEST ID
                                         ;;**************************************************************
                                         .SBTTL
                                         .SBTTL TEST 46
                                         .SBTTL
1571 005626  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                             ;ERROR/LOOP ON TEST
     005630  005640                                  40$                     ;TEST START LOCATION
     005632  005640                                  1$                      ;LOOP ON ERROR START LOCATION
     005634  000000                                  0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     005636  005646                                  25$                     ;LOOP ON ERROR END LOCATION
     005640                                  40$:
1572 005640  052737  040000  177744          1$:     BIS #BIT14,CME          ;WRITE 1 INTO BIT14
1573
     005646  000240                          25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005650  000240                                  NOP                     ;FOR  LOOP ON ERROR
```

```
1574 005652  032737  040000  177744          BIT #BIT14,CME          ;CHECK FOR 0
1575 005660  001403                          BEQ 10$                 ;PASS
1576
     005662  104000                          ERROR                           ;ERROR
                                                                             ;-----
     005664  005662                          .-2
1577                                                                 ;CME UNUSED BIT JEST
1578                                                                 ;READ 1 FROM UNUSED CME BIT14
1579 005666  000000                          0
1580 005670  000240                  10$:    NOP                     ;END OF TEST
1581
1582
1583                              .SBTTL *
1584                              .SBTTL
1585                              .SBTTL *                    CACHE CONTROL REGISTER BYTE TESTS (CCR)
1586                              .SBTTL
1587                              .SBTTL *
1588
1589
1590 005672  005237  001464      T47:        INC $TESTN              ;UPDATE TEST ID
                                 ;;*****************************************************************
                                 .SBTTL
                                 .SBTTL TEST 47
                                 .SBTTL
1591                             ;;*****************************************************************
1592                             .SBTTL  REGISTER BYTE SELECTION LOGIC TEST
1593                             .SBTTL  WRITE ONE INTO LOW BYTE WRITE ZERO INTO HIGH BYTE
1594                             .SBTTL  VERIFY THAT LOW BYTE DATA IS NOT EFFECTED BY WRITE TO HIGH BYTE
1595                             .SBTTL
1596                             ;;*****************************************************************
1597 005676  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     005700  005710                          40$                     ;TEST START LOCATION
     005702  005710                          1$                      ;LOOP ON ERROR START LOCATION
     005704  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     005706  005724                          25$                     ;LOOP ON ERROR END LOCATION
     005710                           40$:
1598 005710  152737  000004  177746  1$:     BISB #BIT02,CCR         ;WRITE 1 INTO CONTROL REGISTER BIT02
1599 005716  142737  000004  177747          BICB #BIT02,CCR+1       ;WRITE 0 INTO CONTROL REGISTER BIT10
1600
     005724  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     005726  000240                          NOP                     ;FOR  LOOP ON ERROR

1601 005730  032737  000004  177746          BIT #BIT02,CCR          ;CHECK FOR 1
1602 005736  001003                          BNE 10$                 ;PASS
1603
     005740  104000                          ERROR                           ;ERROR
                                                                             ;-----
     005742  005740                          .-2
1604                                                                 ;CACHE CONTROL REGISTER BYTE TESTS
1605                                                                 ;WROTE ONE INTO LOW BYTE BIT02
1606                                                                 ;WROTE ZERO INTO HIGH BYTE BIT10
1607                                                                 ;READ ZERO FROM BIT02
1608 005744  000000                          0
1609 005746  000240                  10$:    NOP             ;END OF TEST
1610
```

...

```
1611
1612 005750  005237  001464          T50:            INC $TESTN              ;UPDATE TEST ID
                                      ;;*****************************************************************
                                      .SBTTL
                                      .SBTTL TEST 50
                                      .SBTTL
1613                                  ;;*****************************************************************
1614                                  .SBTTL  WRITE ZERO INTO HIGH BYTE WRITE ONE INTO LOW BYTE
1615                                  .SBTTL  VERIFY HIGH BYTE NOT EFFECTED BY WRITE INTO LOW BYTE
1616                                  .SBTTL
1617                                  ;;*****************************************************************
1618 005754  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      005756  005766                            40$                     ;TEST START LOCATION
      005760  005766                            1$                      ;LOOP ON ERROR START LOCATION
      005762  000000                            0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      005764  006002                            25$                     ;LOOP ON ERROR END LOCATION
      005766                            40$:
1619 005766  142737  000004  177747      1$:     BICB #BIT02,CCR+1       ;WRITE 0 INTO CONTROL REGISTER BIT10
1620 005774  152737  000004  177746              BISB #BIT02,CCR         ;WRITE 1 INTO CONTROL REGISTER BIT02
1621
      006002  000240                    25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      006004  000240                             NOP                     ;FOR  LOOP ON ERROR

1622 006006  032737  002000  177746              BIT #BIT10,CCR          ;CHECK FOR 0 BIT10
1623 006014  001403                              BEQ 10$                 ;PASS
1624
      006016  104000                             ERROR                           ;ERROR
                                                                                 ;-----
      006020  006016                             .-2
1625                                                                    ;CACHE CONTROL REGISTER BYTE TESTS
1626                                                                    ;WROTE ZERO INTO HIGH BYTE BIT10
1627                                                                    ;WROTE ONE  INTO LOW BYTE BIT02
1628                                                                    ;READ ZERO FROM BIT02 OR READ ONE FROM BIT10
1629 006022  000000                             0
1630 006024  000240                    10$:     NOP             ;END OF TEST
1631
1632
1633
1634
1635                                  .SBTTL *
1636                                  .SBTTL
1637                                  .SBTTL *                  CACHE MAINTENANCE REGISTER DATA TEST (CMR )
1638                                  .SBTTL
1639                                  .SBTTL *
1640
1641
1642
1643
1644 006026  005237  001464          T51:            INC $TESTN              ;UPDATE TEST ID
                                      ;;*****************************************************************
                                      .SBTTL
                                      .SBTTL TEST 51
                                      .SBTTL
1645                                  ;;*****************************************************************
1646                                  .SBTTL  VERIFY CMR BIT00(TDAR) CAN BE WRITTEN TO A 0
1647                                  .SBTTL
```

```
1648                                ;;*****************************************************************
1649 006032  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
     006034  006044                        40$                     ;TEST START LOCATION
     006036  006044                        1$                      ;LOOP ON ERROR START LOCATION
     006040  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     006042  006056                        25$                     ;LOOP ON ERROR END LOCATION
     006044                          40$:
1650 006044  042737  000001  177750  1$:   BIC #BIT00,CMR           ;WRITE 0 INTO CMR BIT00
1651 006052  013700  177750                MOV CMR,R0              ;SAVE CONTENTS OF CMR
1652
     006056  000240                 25$:   NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     006060  000240                        NOP                     ;FOR  LOOP ON ERROR

1653 006062  005037  177750                CLR CMR                 ;CLR MAINT
1654 006066  032700  000001                BIT #BIT00,R0           ;CHECK FOR 0 IN BIT00
1655 006072  001403                        BEQ 10$                 ;PASS
1656
     006074  104000                        ERROR                           ;ERROR
                                                                            ;-----
     006076  006074                        .-2
1657                                                                ;MAINTENANCE REGISTER DATA TEST
1658                                                                ;WROTE 0 INTO CMR BIT00; READ 1
1659 006100  000000                        0
1660 006102  000240                 10$:   NOP             ;END OF TEST
1661
1662
1663
1664 006104  005237  001464         T52:   INC $TESTN              ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 52
                                    .SBTTL
1665                                ;;*****************************************************************
1666                                .SBTTL  VERIFY CMR BIT00(TDAR) CAN BE WRITTEN TO A 1
1667                                .SBTTL
1668                                ;;*****************************************************************
1669 006110  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
     006112  006122                        40$                     ;TEST START LOCATION
     006114  006122                        1$                      ;LOOP ON ERROR START LOCATION
     006116  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     006120  006134                        25$                     ;LOOP ON ERROR END LOCATION
     006122                          40$:
1670 006122  052737  000001  177750  1$:   BIS #BIT00,CMR           ;WRITE 1 INTO CMR BIT00
1671 006130  013700  177750                MOV CMR,R0              ;SAVE CONTENTS OF CMR
1672
     006134  000240                 25$:   NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     006136  000240                        NOP                     ;FOR  LOOP ON ERROR

1673 006140  005037  177750                CLR CMR                 ;CLR MAINT
1674 006144  032700  000001                BIT #BIT00,R0           ;CHECK FOR 1 IN BIT00
1675 006150  001003                        BNE 10$                 ;PASS
1676
     006152  104000                        ERROR                           ;ERROR
                                                                            ;-----
     006154  006152                        .-2
```

```
1677                                                    ;MAINTENANCE REGISTER DATA TEST
1678                                                    ;WROTE 1 INTO CMR BIT00; READ 0
1679 006156  000000                        0
1680 006160  000240                10$:     NOP                ;END OF TEST
1681
1682
1683
1684 006162  005237  001464       T53:     INC $TESTN                 ;UPDATE TEST ID
                                   ;;*****************************************************************
                                   .SBTTL
                                   .SBTTL TEST 53
                                   .SBTTL
1685                               ;;*****************************************************************
1686                               .SBTTL  VERIFY CMR BIT01(HODO) CAN BE WRITTEN AS A 0.
1687                               .SBTTL
1688                               ;;*****************************************************************
1689 006166  000004                        SCPCND                     ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                       ;ERROR/LOOP ON TEST
      006170  006200                        40$                        ;TEST START LOCATION
      006172  006200                        1$                         ;LOOP ON ERROR START LOCATION
      006174  000000                        0                          ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      006176  006212                        25$                        ;LOOP ON ERROR END LOCATION
      006200                           40$:
1690 006200  042737  000002  177750   1$:     BIC #BIT01,CMR             ;WRITE 0 INTO CMR BIT01
1691 006206  013700  177750                  MOV CMR,R0                 ;SAVE CONTENTS OF CMR
1692
      006212  000240                   25$:    NOP                        ;INSTRUCTION 'JMP 1$' PLACED HERE
      006214  000240                           NOP                        ;FOR  LOOP ON ERROR

1693 006216  005037  177750                  CLR CMR                    ;CLR MAINT
1694 006222  032700  000002                  BIT #BIT01,R0              ;CHECK FOR 0 IN BIT01
1695 006226  001403                          BEQ 10$                    ;PASS
1696
      006230  104000                         ERROR                              ;ERROR
                                                                                ;-----
      006232  006230                         .-2
1697                                                    ;MAINTENANCE REGISTER DATA TEST
1698                                                    ;WROTE 0 INTO CMR BIT01; READ 1
1699 006234  000000                        0
1700 006236  000240                10$:     NOP                ;END OF TEST
1701
1702
1703
1704 006240  005237  001464       T54:     INC $TESTN                 ;UPDATE TEST ID
                                   ;;*****************************************************************
                                   .SBTTL
                                   .SBTTL TEST 54
                                   .SBTTL
1705                               ;;*****************************************************************
1706                               .SBTTL  VERIFY CMR BIT01(HODO) CAN BE WRITTEN AS A 1.
1707                               .SBTTL
1708                               ;;*****************************************************************
1709 006244  000004                        SCPCND                     ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                       ;ERROR/LOOP ON TEST
      006246  006256                        40$                        ;TEST START LOCATION
      006250  006256                        1$                         ;LOOP ON ERROR START LOCATION
      006252  000000                        0                          ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
```

```
     006254  006270                          25$                     ;LOOP ON ERROR END LOCATION
     006256                          40$:
1710 006256  052737  000002  177750  1$:     BIS #BIT01,CMR          ;WRITE 1 INTO CMR BIT01
1711 006264  013700  177750                  MOV CMR,R0              ;SAVE CONTENTS OF CMR
1712
     006270  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     006272  000240                          NOP                     ;FOR  LOOP ON ERROR

1713 006274  005037  177750                  CLR CMR                 ;CLR MAINT
1714 006300  032700  000002                  BIT #BIT01,R0           ;CHECK FOR 1 IN BIT01
1715 006304  001003                          BNE 10$                 ;PASS
1716
     006306  104000                          ERROR                           ;ERROR
                                                                             ;-----
     006310  006306                          .-2
1717                                                                 ;MAINTENANCE REGISTER DATA TEST
1718                                                                 ;WROTE 1 INTO CMR BIT01; READ 0
1719 006312  000000                          0
1720 006314  000240                  10$:    NOP             ;END OF TEST
1721
1722
1723
1724 006316  005237  001464          T55:    INC $TESTN              ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 55
                                    .SBTTL
1725                                ;;*****************************************************************
1726                                .SBTTL   VERIFY CMR BIT03(AM) CAN BE WRITTEN AS A 0.
1727                                .SBTTL
1728                                ;;*****************************************************************
1729 006322  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     006324  006334                          40$                     ;TEST START LOCATION
     006326  006334                          1$                      ;LOOP ON ERROR START LOCATION
     006330  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     006332  006360                          25$                     ;LOOP ON ERROR END LOCATION
     006334                          40$:
1730 006334  012737  177777  177752  1$:     MOV #-1,CHR             ;ALL 1'S TO AMR
1731 006342  112737  000374  177751          MOVB #374,CMR+1
1732 006350  105037  177750                  CLRB CMR                ;WRITE 0 INTO CMR BIT03
1733 006354  013700  177750                  MOV CMR,R0              ;SAVE CONTENTS OF CMR
1734
     006360  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     006362  000240                          NOP                     ;FOR  LOOP ON ERROR

1735 006364  005037  177750                  CLR CMR                 ;CLR MAINT
1736 006370  032700  000010                  BIT #BIT03,R0           ;CHECK FOR 0 IN BIT03
1737 006374  001403                          BEQ 10$                 ;PASS
1738
     006376  104000                          ERROR                           ;ERROR
                                                                             ;-----
     006400  006376                          .-2
1739                                                                 ;MAINTENANCE REGISTER DATA TEST
1740                                                                 ;WROTE 0 INTO CMR BIT03; READ 1
1741 006402  000000                          0
1742 006404  000240                  10$:    NOP             ;END OF TEST
```

```
                                        T56:            INC $TESTN              ;UPDATE TEST ID
                                        ;;**************************************************************************
                                        .SBTTL
                                        .SBTTL TEST 56
                                        .SBTTL
                                        ;;**************************************************************************
                                        .SBTTL  VERIFY BIT03(AM) CAN BE WRITTEN AS A 1.
                                        .SBTTL
                                        ;;**************************************************************************
006412  000004                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
006414  006424                                40$                     ;TEST START LOCATION
006416  006424                                1$                      ;LOOP ON ERROR START LOCATION
006420  000000                                0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
006422  006456                                25$                     ;LOOP ON ERROR END LOCATION
006424                                  40$:
006424  012737  177777  177752      1$:     MOV #-1,CHR
006432  112737  000374  177751              MOVB #374,CMR+1
006440  105037  177750                      CLRB CMR                ;PRECONDITION AM BIT TO 0
006444  112737  000010  177750              MOVB #AM,CMR            ;WRITE 1 INTO AM BIT
006452  013700  177750                      MOV CMR,R0              ;SAVE CONTENTS OF CMR

006456  000240                          25$:  NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
006460  000240                                NOP                     ;FOR  LOOP ON ERROR

006462  005037  177750                      CLR CMR                 ;CLR MAINT
006466  032700  000010                      BIT #BIT03,R0           ;CHECK FOR 1 IN BIT03
006472  001003                              BNE 10$                 ;PASS

006474  104000                              ERROR                           ;ERROR
                                                                            ;-----
006476  006474                              .-2
                                                                        ;MAINTENANCE REGISTER DATA TEST
                                                                        ;WROTE 1 INTO CMR BIT03; READ 0
006500  000000                              0
006502  000240                    10$:      NOP             ;END OF TEST


                                                .SBTTL    CMR UNUSED BIT TESTS


                                        T57:            INC $TESTN              ;UPDATE TEST ID
                                        ;;**************************************************************************
                                        .SBTTL
                                        .SBTTL TEST 57
                                        .SBTTL
```

```
                                ;;*****************************************************************
                                .SBTTL  ATTEMPT WRITE 1 INTO ALL UNUSED BITS OF CMR. ALL
                                .SBTTL  BITS SHOULD READ 0.
                                .SBTTL
                                ;;*****************************************************************
006510  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
006512  006522                          40$                     ;TEST START LOCATION
006514  006522                          1$                      ;LOOP ON ERROR START LOCATION
006516  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
006520  006530                          25$                     ;LOOP ON ERROR END LOCATION
006522                          40$:
006522  052737  000040  177750    1$:   BIS #BIT05,CMR          ;WRITE 1 INTO BIT05

006530  000240                  25$:   NOP                      ;INSTRUCTION 'JMP 1$' PLACED HERE
006532  000240                         NOP                      ;FOR  LOOP ON ERROR

006534  032737  000040  177750        BIT #BIT05,CMR           ;CHECK FOR 0
006542  001403                        BEQ 10$                  ;PASS

006544  104000                        ERROR                           ;ERROR
                                                                        ;-----
006546  006544                        .-2
                                                                ;CMR UNUSED BIT TEST
                                                                ;READ 1 FROM UNUSED CMR BIT05
006550  000000                        0
006552  000240                  10$:  NOP                       ;END OF TEST
006554  005237  001464          T60:  INC $TESTN                ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 60
                                .SBTTL
006560  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
006562  006572                          40$                     ;TEST START LOCATION
006564  006572                          1$                      ;LOOP ON ERROR START LOCATION
006566  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
006570  006600                          25$                     ;LOOP ON ERROR END LOCATION
006572                          40$:
006572  052737  000100  177750    1$:   BIS #BIT06,CMR          ;WRITE 1 INTO BIT06

006600  000240                  25$:   NOP                      ;INSTRUCTION 'JMP 1$' PLACED HERE
006602  000240                         NOP                      ;FOR  LOOP ON ERROR

006604  032737  000100  177750        BIT #BIT06,CMR           ;CHECK FOR 0
006612  001403                        BEQ 10$          ;PASS

006614  104000                        ERROR                           ;ERROR
                                                                        ;-----
006616  006614                        .-2
                                                                ;CMR UNUSED BIT TEST
                                                                ;READ 1 FROM UNUSED CMR BIT02
006620  000000                        0
006622  000240                  10$:  NOP                       ;END OF TEST
006624  005237  001464          T61:  INC $TESTN                ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
```

```
                                .SBTTL TEST 61
                                .SBTTL
1807 006630  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                   ;ERROR/LOOP ON TEST
     006632  006642                        40$                     ;TEST START LOCATION
     006634  006642                        1$                      ;LOOP ON ERROR START LOCATION
     006636  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     006640  006650                        25$                     ;LOOP ON ERROR END LOCATION
     006642                          40$:
1808 006642  052737  000200  177750   1$:    BIS #BIT07,CMR          ;WRITE 1 INTO BIT07
1809
     006650  000240                  25$:   NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     006652  000240                         NOP                     ;FOR  LOOP ON ERROR

1810 006654  032737  000200  177750        BIT #BIT07,CMR          ;CHECK FOR 0
1811 006662  001403                        BEQ 10$                 ;PASS
1812
     006664  104000                        ERROR                           ;ERROR
                                                                           ;-----
     006666  006664                        .-2
1813                                                               ;CMR UNUSED BIT TEST
1814                                                               ;READ 1 FROM UNUSED CMR BIT03
1815 006670  000000                        0
1816 006672  000240                  10$:  NOP               ;END OF TEST
1817
1818
1819
1820
1821                            .SBTTL *
1822                            .SBTTL
1823                            .SBTTL *                              ADDRESS MATCH REGISTER TESTS (AMR TESTS)
1824                            .SBTTL
1825                            .SBTTL *
1826
1827
1828
1829
1830
1831
1832 006674  005237  001464    T62:          INC $TESTN              ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 62
                                .SBTTL
1833                            .SBTTL
1834                            .SBTTL  MA<21:0> ADDRESS LINES ALL 1'S
1835                            .SBTTL  CA<21:0> ADDRESS LINES ALL 0'S
1836                            .SBTTL  AMR<21:0> DATA LINES ALL 0'S
1837                            ;;;      AM BIT SHOULD READ 1.
1838                            ;;;           -----
1839                            ;;*****************************************************************
1840 006700  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                   ;ERROR/LOOP ON TEST
     006702  006712                        40$                     ;TEST START LOCATION
     006704  006712                        1$                      ;LOOP ON ERROR START LOCATION
     006706  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     006710  006752                        25$                     ;LOOP ON ERROR END LOCATION
```

```
006712                                     40$:
006712  012737  177777  177752             1$:    MOV #-1,CHR             ;ALL 1'S TO AMR
006720  112737  000374  177751                    MOVB #374,CMR+1
006726  105037  177750                            CLRB CMR                ;PRECONDITION AM BIT TO 0
006732  005037  177752                            CLR CHR                 ;ALL 0'S TO AMR<21:0>
006736  105037  177751                            CLRB CMR+1
006742  005737  000000                            TST 0                   ;PLACE ALL 0'S ON CA<21:0>.HOWEVER,
                                                                          ;THIS IS NOT WHEN THE AM BIT IS SET:
                                                                          ;WHEN PAX ADDRESS LINES ARE NOT BEING
                                                                          ;ACCESSED BY THE CPU, THE CACHE DEFAULTS
                                                                          ;TO SELECTING MA<21:0> ADDRESS LINES.
                                                                          ;IN THIS SITUATION, MA<21:0> DEFAULTS
                                                                          ;TO ALL 1'S THEREBY PLACING ALL 0'S
                                                                          ;ON CA<21:0>.  THEREFORE, FOLLOWING THE LOADING
                                                                          ;OF ALL 0'S INTO AMR<21:0>,AND BEFORE THE
                                                                          ;'TST 0' INSTRUCTION, THE AM BIT SHOULD
                                                                          ;BE SET DUE TO MATCH BETWEEN AMR<21:0> AND CA<21:0>
                                                                          ; ADDRESS LINES.
006746  013703  177750                            MOV CMR,R3              ;SAVE AM BIT RESULT IN CMR

006752  000240                             25$:   NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
006754  000240                                    NOP                     ;FOR  LOOP ON ERROR

006756  032703  000010                            BIT #AM,R3              ;AM BIT SHOULD READ 1 INDICATING MATCH
006762  001003                                    BNE 10$                 ;PASS

006764  104000                                    ERROR                           ;ERROR
                                                                                  ;-----
006766  006764                                    .-2
                                                                          ;AMR TESTS
                                                                          ;AMR BIT DID NOT READ 1 INDICATING
                                                                          ;A MATCH OF ALL 0'S BETWEEN MA TO CA<21:0>
                                                                          ;ADDRESS LINES AND AMR<21:0> DATA
006770  000000                                    0                       ;ERROR PRINT TERMIN.
006772  000240                             10$:   NOP          ;END OF TEST



                                   ;;;            MEMORY MANAGEMENT

006774  012737  077406  172300     MAGPRE:        MOV #77406,KPDR0        ;ALLOW ALL ACCESS TO KERNEL PAGE 0
007002  012737  077406  172302                    MOV #77406,KPDR1        ;ALLOW ALL ACCESS TO KERNEL PAGE 1
007010  012737  077406  172304                    MOV #77406,KPDR2        ;ALLOW ALL ACCESS TO KERNEL PAGE 2
007016  012737  077406  172306                    MOV #77406,KPDR3        ;ALLOW ALL ACCESS TO KERNEL PAGE 3
007024  012737  077406  172310                    MOV #77406,KPDR4        ;ALLOW ALL ACCESS TO KERNEL PAGE 4
007032  012737  077406  172312                    MOV #77406,KPDR5        ;ALLOW ALL ACCESS TO KERNEL PAGE 5
007040  012737  077406  172314                    MOV #77406,KPDR6        ;ALLOW ALL ACCESS TO KERNEL PAGE 6
007046  012737  077406  172316                    MOV #77406,KPDR7        ;ALLOW ALL ACCESS TO KERNEL PAGE 7
007054  012737  000000  172340                    MOV #0,KPAR0            ;MAP PAGE 0 FOR 0-4K
007062  012737  000200  172342                    MOV #200,KPAR1          ;MAP PAGE 1 FOR 4-8K
007070  012737  000400  172344                    MOV #400,KPAR2          ;MAP PAGE 2 FOR 8-12K
007076  012737  000600  172346                    MOV #600,KPAR3          ;MAP PAGE 3 FOR 12-16K
007104  012737  177600  172356                    MOV #177600,KPAR7               ;MAP PAGE 7 FOR 124-128K


                                   ;              UNIBUS MAP

```

```
1891 007112  012737  000000  170200                  MOV #0,UMPR00          ;MAP REGISTER SET 0 FOR 0-4K
1892 007120  012737  000000  170202                  MOV #0,UMPR01
1893 007126  012737  020000  170204                  MOV #20000,UMPR02      ;MAP REGISTER SET 1 FOR 4K-8K
1894 007134  012737  000000  170206                  MOV #0,UMPR03
1895 007142  012737  040000  170210                  MOV #40000,UMPR04      ;MAP REGISTER SET 2 FOR 8K-12K
1896 007150  012737  000000  170212                  MOV #0,UMPR05
1897 007156  012737  060000  170214                  MOV #60000,UMPR06      ;MAP REGISTER SET 3 FOR 12K-16K
1898 007164  012737  000000  170216                  MOV #0,UMPR07
1899
1900
1901
1902
1903
1904 007172  005237  001464          T63:            INC $TESTN             ;UPDATE TEST ID
                                      ;;*****************************************************************
                                      .SBTTL
                                      .SBTTL TEST 63
                                      .SBTTL
1905                                  .SBTTL
1906                                  .SBTTL  MA<21:0> ADDRESS LINES ALL 0'S
1907                                  .SBTTL  CA<21:0> ADDRESS LINES ALL 1'S
1908                                  .SBTTL  AMR<21:0> DATA LINES ALL 1'S
1909                                  .SBTTL       AM BIT SHOULD READ 1.
1910                                  ;;*****************************************************************
```

```
AM BIT SHOULD READ 1.

1912 007176  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     007200  007210                          40$                     ;TEST START LOCATION
     007202  007210                          1$                      ;LOOP ON ERROR START LOCATION
     007204  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     007206  007234                          25$                     ;LOOP ON ERROR END LOCATION
     007210                          40$:
1913 007210  012737  177777  177752   1$:    MOV #-1,CHR             ;LOAD AMR<15:0> WITH 1'S FROM CHR<15:0>
1914 007216  112737  000374  177751          MOVB #374,CMR+1         ;LOAD AMR<21:16> ALL 1'S
1915 007224  105037  177750                  CLRB CMR                ;PRECONDITION AM BIT TO 0
1916 007230  105737  177777                  TSTB 177777             ;PUT ALL 1'S ON MA AND PA ADDRESS LINES
1917                                                                 ;MA WILL BE SELECTED
1918
     007234  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     007236  000240                          NOP                     ;FOR  LOOP ON ERROR

1919 007240  032737  000010  177750          BIT #AM,CMR             ;AM BIT SHOULD READ 1 INDICATING MATCH
1920 007246  001003                          BNE 10$                 ;PASS
1921
     007250  104000                          ERROR                           ;ERROR
                                                                             ;-----
     007252  007250                          .-2
1922                                                                 ;AMR TESTS
1923                                                                 ;AMR BIT DID NOT READ 1 INDICATING
1924                                                                 ;A MATCH OF ALL 1'S BETWEEN CA<21:0>
1925                                                                 ;ADRESS LINES AND AMR<21:0> DATA
1926 007254  000000                          0                       ;ERROR PRINT TERMIN.
1927 007256  000240                  10$:    NOP             ;END OF TEST
1928
1929
1930 007260  005237  001464          T64:    INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 64
                                     .SBTTL
1931                                 ;;*****************************************************************
1932                                 ;;; VERIFY NO AMR LINES SHORTED TO EACH OTHER; OR NO AMR LINES
1933                                 ;;;        SHORTED TO CA LINES
1934                                 .SBTTL
1935                                 .SBTTL  MA<21:0> ADDRESS LINES ALL 1'S
1936                                 .SBTTL  CA<21:0> ADDRESS LINES ALL 0'S
1937                                 .SBTTL  AMR<15:0> FLOATING 1 PATTERN
1938                                 .SBTTL       FOR EACH FLOATING 1 PATTERN  AM BIT SHOULD READ 0.
1939                                 .SBTTL
1940                                 ;;*****************************************************************
1941 007264  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     007266  007276                          40$                     ;TEST START LOCATION
     007270  060006                          1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
     007272  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     007274  060034                          25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
     007276  012737  001015  177746   40$:    MOV #OFF,CCR            ;DISABLE CACHE
     007304  004437  002324                  JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
     007310  007456                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

```
1942 007312  012737  000001  002056          MOV #1,CHRPAT           ;SETUP 1ST PATTERN FOR CHR<15:0>
1943 007320                          1$:
1944 007320  013737  002056  177752          MOV CHRPAT,CHR          ;LOAD AMR<15:0> FROM CHR<15:0>
1945 007326  105037  177751                  CLRB CMR+1              ;LOAD AMR<21:16> FROM CMR<15:10>
1946 007332  105037  177750                  CLRB CMR                ;PRECONDITION AM BIT TO 0
1947 007336  005737  000000                  TST 0                   ;PLACE ALL 0'S ON CA<21:0>.
1948                                                                 ;WHEN PAX ADDRESS LINES ARE NOT BEING
1949                                                                 ;ACCESSED BY THE CPU, THE CACHE DEFAULTS
1950                                                                 ;TO SELECTING MA<21:0> ADDRESS LINES.
1951                                                                 ;IN THIS SITUATION, MA<21:0> DEFAULTS
1952                                                                 ;TO ALL 1'S THEREBY PLACING ALL 0'S
1953                                                                 ;ON CA<21:0>.  THEREFORE, FOLLOWING THE LOADING
1954                                                                 ;OF ALL 0'S INTO AMR<21:0>,AND BEFORE THE
1955                                                                 ;'TST 0' INSTRUCTION,ALL 0'S ARE PLACED
1956                                                                 ; ON CA<21:0> ADDRESS LINES.
1957 007342  013703  177750                  MOV CMR,R3              ;SAVE AM BIT RESULT IN CMR
1958
     007346  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     007350  000240                          NOP                     ;FOR  LOOP ON ERROR

1959 007352  032703  000010                  BIT #AM,R3              ;CHECK FOR 0.
1960 007356  001432                          BEQ 9$                  ;PASS
1961 007360  005037  047302                  CLR CA210+2             ;PREPARE CA210 FOR TYPEOUT
1962 007364  005037  047300                  CLR CA210
1963 007370  013737  002056  047306          MOV CHRPAT,AMR210+2     ;PREPARE PATTERN USED FOR AMR<21:0>
1964                                                                 ;FOR ERROR TYPEOUT
1965 007376  013737  002056  047304          MOV CHRPAT,AMR210
1966 007404  012737  000017  002052          MOV #15.,LOOP
1967 007412  006237  047304          3$:     ASR AMR210
1968 007416  042737  100000  047304          BIC #100000,AMR210
1969 007424  005337  002052                  DEC LOOP
1970 007430  001370                          BNE 3$
1971
     007432  104000                          ERROR                           ;ERROR
                                                                             ;-----
     007434  007432                          .-2
1972                                                         ;AMR TESTS
1973                                                         ;AM BIT SHOULD HAVE READ 0 INDICATING A
1974                                                         ;NO-MATCH CONDITION.
1975 007436  047300                          CA210           ;PRINT PATTERN USED FOR CACHE ADDRESS LINES CA<21:0>
1976 007440  047304                          AMR210          ;PRINT FLOATING 1 PATTERN USED FOR AMR<21:0> DATA
1977 007442  000000                          0
1978                                 ;;;
1979 007444  006337  002056          9$:     ASL CHRPAT                      ;NEXT FLOATING 1 PATTERN
1980 007450  103401                          BCS 10$         ;IF PHYSICAL ADDRESS 100000 DONE;THEN FINISHED
1981 007452  000722                          BR 1$           ;IF NOT CONTINUE WITH NXT PATTERN
1982 007454  000240                  10$:    NOP             ;END OF TEST
1983
1984
1985 007456  005237  001464          T65:    INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 65
                                     .SBTTL
1986                                 .SBTTL
1987                                 .SBTTL  MA<21:0> ADDRESS LINES ALL 1'S
```

```
                                        .SBTTL  CA<21:0> ADDRESS LINES ALL 0'S
                                        .SBTTL  AMR<21:16> FLOATING 1 PATTERN
                                        .SBTTL       FOR EACH FLOATING 1 PATTERN  AM BIT SHOULD READ 0.
                                        ;;*****************************************************************
007462  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
007464  007474                                  40$                     ;TEST START LOCATION
007466  060006                                  1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
007470  000000                                  0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
007472  060034                                  25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
007474  012737  001015  177746          40$:    MOV #OFF,CCR            ;DISABLE CACHE
007502  004437  002324                          JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
007506  007636                                  10$+2                   ;ADDRESS OF START OF NEXT TEST

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

007510  012737  000004  002054                   MOV #4,CMRPAT           ;SETUP 1ST PATTERN FOR CMR<21:16>
007516                                  1$:
007516  113737  002054  177751                   MOVB CMRPAT,CMR+1       ;LOAD AMR<21:16> FROM CMR<15:10>
007524  005037  177752                          CLR CHR                 ;LOAD ALL 0'S TO AMR<15:0> FROM CHR<15:0>
007530  105037  177750                          CLRB CMR                ;PRECONDITION AM BIT TO 0
007534  005737  000000                          TST 0                   ;SAVE CMR CONTENTS.  BEFORE THE FETCH
                                                                        ;OF THIS INSTRUCTION, ALL 0'S WILL
                                                                        ;BE PLACED ON CA<21:0> LINES.
007540  013703  177750                          MOV CMR,R3              ;SAVE CMR CONTENTS

007544  000240                          25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
007546  000240                                  NOP                     ;FOR  LOOP ON ERROR

007550  032703  000010                          BIT #AM,R3              ;CHECK FOR 0.
007554  001420                                  BEQ 9$                  ;PASS
007556  005037  047302                          CLR CA210+2             ;PREPARE CA210 FOR PRINTOUT
007562  005037  047300                          CLR CA210
007566  005037  047306                          CLR AMR210+2            ;PREPARE PATTERN USED FOR AMR<21:0>
007572  013737  002054  047304                  MOV CMRPAT,AMR210
007600  006237  047304                          ASR AMR210

007604  104000                                  ERROR                           ;ERROR
                                                                                ;-----
007606  007604                                  .-2

                                                                        ;AMR TESTS
                                                                        ;AM BIT SHOULD HAVE READ 0 INDICATING A
                                                                        ;NO-MATCH CONDITION.
007610  047300                                  CA210                   ;PRINT PATTERN USED FOR CACHE ADDRESS LINES CA<21:0>
007612  047304                                  AMR210                  ;PRINT FLOATING 1 PATTERN USED FOR AMR<21:0> DATA
007614  000000                                  0
007616  006337  002054                  9$:     ASL CMRPAT                      ;NEXT FLOATING 1 PATTERN
007622  032737  000400  002054                  BIT #400,CMRPAT         ;IF PHYSICAL ADDRESS 10000000 DONE;FINISHED
007630  001001                                  BNE 10$
007632  000731                                  BR 1$                   ;IF NOT CONTINUE WITH NXT PATTERN
007634  000240                          10$:    NOP             ;END OF TEST

007636  005237  001464          T66:            INC $TESTN              ;UPDATE TEST ID
                                        ;;*****************************************************************
                                        .SBTTL
```

```
                                .SBTTL TEST 66
                                .SBTTL
                                .SBTTL
2025                            ;;;     VERIFY NO MA TO CA LINES ARE SHORT TO EACH OTHER.
2026                            .SBTTL  MA<12:0> ADDRESS LINES FLOATING 0
2027                            .SBTTL  CA<12:0> ADDRESS LINES FLOATING 1
2028                            .SBTTL          AMR<12:0> FLOATING 1 PATTERN
2029                            .SBTTL          AM BIT READS 1
2030                            ;;*****************************************************************
2031
2032 007642  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                       ;ERROR/LOOP ON TEST
      007644  007654                           40$                     ;TEST START LOCATION
      007646  060020                           1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
      007650  000000                           0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      007652  060114                           25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
      007654  012737  001015  177746    40$:    MOV #OFF,CCR            ;DISABLE CACHE
      007662  004437  002324                    JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
     .007666  010102                           10$+2                   ;ADDRESS OF START OF NEXT TEST

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

2033 007670  012737  000001  047332            MOV #1,FLTPAT           ;1ST FLOATING 1 PATTERN: 00001
2034 007676  012701  100001                    MOV #100001,R1          ;LOAD VIRTUAL ADDRESS. SELECTS KPAR4
2035                                                                   ;AND SPECIFIES OFFSET FOR PHYSICAL ADDRESS.
2036 007702  012737  170000  172350            MOV #170000,KPAR4       ;MAP PAGE 4 FOR TOP 124K ADDRESSING.
2037                                                                   ;TOGETHER WITH VIRTUAL ADDRESS WILL
2038                                                                   ;PLACE 17000001 ON PA LINES AND
2039                                                                   ;00000001 ON MA LINES FOR 1ST FLOATING
2040                                                                   ;1 PATTERN.
2041
2042 007710  012737  000001  177572    1$:     MOV #1,SR0              ;ENABLE MEM. MNGMENT.
2043 007716  012737  000020  172516            MOV #20,SR3             ;ENABLE 22-BIT MAPPING
2044 007724  013737  047332  177752            MOV FLTPAT,CHR          ;LOAD AMR WITH FLOATING 1 PATTERN
2045 007732  105037  177751                    CLRB CMR+1
2046 007736  105037  177750                    CLRB CMR                ;PRECONDITION AM BIT TO 0
2047 007742  023727  047332  000001            CMP FLTPAT,#1           ;FOR 1ST PATTERN USE TSTB
2048 007750  001004                            BNE 2$
2049 007752  105711                            TSTB (R1)               ;
2050 007754  000240                            NOP
2051 007756  000240                            NOP
2052 007760  000403                            BR 4$
2053 007762  005711                    2$:     TST (R1)                ;
2054 007764  000240                            NOP
2055 007766  000240                            NOP
2056 007770  013703  177750            4$:     MOV CMR,R3
2057 007774  005037  177572                    CLR SR0                 ;DISABLE MEM. MNGMNT.
2058 010000  005037  172516                    CLR SR3
2059
      010004  000240                   25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      010006  000240                           NOP                     ;FOR  LOOP ON ERROR

2060 010010  032703  000010                    BIT #AM,R3              ;CHECK FOR 1
2061 010014  001017                            BNE 9$                  ;PASS
2062 010016  013737  047332  047306            MOV FLTPAT,AMR210+2     ;PREPARE PATTERN USED FOR AMR<21:0>
2063                                                                   ;FOR ERROR TYPEOUT
2064 010024  005037  047304                    CLR AMR210
```

```
 2065 010030  013737  047332  047302          MOV FLTPAT,CA210+2      ;PREPARE PATT. USED FOR CA<21:0 > FOR ERROR TYPE
 2066 010036  005037  047300                  CLR CA210
 2067
      010042  104000                          ERROR                           ;ERROR
                                               ;-----
      010044  010042                          .-2
 2068                                          ;AMR TESTS
 2069                                          ;AM BIT DID NOT READ 1
 2070 010046  047300                          CA210                           ;PRINT FLOATING 1 PATTERN USED FOR CA<21:0>
 2071 010050  047304                          AMR210                          ;PRINT FLOAT 1 PATTRN. USED FOR AMR<21:0>
 2072 010052  000000                          0
 2073 010054  006337  047332          9$:     ASL FLTPAT                      ;NXT PATTERN
 2074 010060  032737  020000  047332          BIT #20000,FLTPAT               ;IF PATTERN 10000 DONE; FINISHED
 2075 010066  001004                          BNE 10$
 2076 010070  006301                          ASL R1                          ;IF NOT NEXT PASS
 2077 010072  052701  100000                  BIS #100000,R1
 2078 010076  000704                          BR 1$
 2079 010100  000240                  10$:    NOP             ;END OF TEST
 2080
 2081
 2082 010102  005237  001464          T67:    INC $TESTN                      ;UPDATE TEST ID
                                   ;;*****************************************************************
                                   .SBTTL
                                   .SBTTL TEST 67
                                   .SBTTL
 2083                              .SBTTL
 2084                              .SBTTL  MA<21:13> ADDRESS LINES FLOATING 0
 2085                              .SBTTL  CA<21:13> ADDRESS LINES FLOATING 1
 2086                              .SBTTL          AMR<21:13> FLOAT. 1 PATTRN.
 2087                              .SBTTL          AM BIT READS 1
 2088                              ;;*****************************************************************
 2089 010106  000004                          SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                              ;ERROR/LOOP ON TEST
      010110  010120                          40$                             ;TEST START LOCATION
      010112  060036                          1$-40$+60000-14                 ;LOOP ON ERROR START LOCATION
      010114  000000                          0                               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      010116  060144                          25$-40$+60000-14                ;LOOP ON ERROR END LOCATION
      010120  012737  001015  177746  40$:     MOV #OFF,CCR                    ;DISABLE CACHE
      010126  004437  002324                  JSR R4,RELCTL                   ;LOCATE TEST CODE TO LOW CACHE SPACE
      010132  010460                          10$+2                           ;ADDRESS OF START OF NEXT TEST

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

 2090 010134  012737  171000  172350  2$:     MOV #171000,KPAR4               ;MAP PAGE 4 FOR TOP 124K ADDRESSING
 2091                                                                         ;WILL ALSO  SELECT UNIBUS MAP REGISTER
 2092                                                                         ;SET #4
 2093
 2094 010142  012737  000040  047332          MOV #40,FLTPAT                  ;SETUP 1ST PATTERN FOR UMPR09
 2095 010150  012737  020000  170220          MOV #20000,UMPR08               ;SETUP 1ST PATTERN FOR UMPR08
 2096                                                                         ;ACCESSING TOP 124K,AND ENABLING
 2097                                                                         ;UNIBUS MAP, THE 1ST ADDRESS WILL BE
 2098                                                                         ;CONSTRUCTED  THRU THE PA<21:)>
 2099                                                                         ;LINES AS 17020000 AND AS 00020000
 2100                                                                         ;THRU THE MA<21:0> LINES. DUE TO TOP 124K
 2101                                                                         ;ADDRESSING CA<21:0> WILL SELECT THE MA LINES.
 2102 010156  012737  000200  002054          MOV #200,CMRPAT                 ;SETUP 1ST PATTERN FOR CMR<15:10>
```

```
2103 010164  012737  020000  002056          MOV #20000,CHRPAT       ;SETUP 1ST PATTERN FOR CHR<15:0>
2104 010172  012737  060126  000004    1$:   MOV #3$-2$+60000,4      ;
2105 010200  012737  000340  000006          MOV #340,6
2106 010206  113737  047333  170222          MOVB FLTPAT+1,UMPR09    ;LOAD UPPER BITS OF UNIBUS MAP REGISTER
2107 010214  113737  002055  177751          MOVB CMRPAT+1,CMR+1     ;LOAD AMR<21:16> FROM CMR<15:10>
2108 010222  013737  002056  177752          MOV CHRPAT,CHR          ;LOAD AMR<15:0> FROM CHR<15:0>
2109 010230  012737  000001  177572          MOV #1,SR0              ;ENABLE MEM MNGMENT
2110 010236  012737  000060  172516          MOV #60,SR3             ;ENABLE UNIBUS MAP AND 22-BIT MAPPING
2111 010244  105037  177750                  CLRB CMR                ;PRECONDITION AM BIT WITH 0
2112 010250  005737  100000                  TST 100000              ;TOP 124K ADDRESSING WILL BE DONE PLACING
2113                                                                 ;THE APPROPRIATE FLOATING 1 ADDRESS PATTERN
2114                                                                 ;ON CA<21:0>.HOWEVER, THIS IS NOT WHEN THE
2115                                                                 ;AM BIT IS SET: WHEN PAX ADDRESS LINES ARE
2116                                                                 ;NOT BEING ACCESSED BY THE CPU,THE CACHE
2117                                                                 ;DEFAULTS TO SELECTING MA<21:0> ADDRESS
2118                                                                 ;LINES. IN THIS SITUATION,MA<21:0> DEFAULTS TO
2119                                                                 ;WHATEVER ADDRESS PATTERN IS BEING SET UP
2120                                                                 ;VIA THE UNIBUS MAP.
2121                                                                 ;THEREFORE AFTER THE 'CLRB CMR' INSTRUCTION
2122                                                                 ;AND BEFORE 'TST 100000' THE AM BIT SHOULD
2123                                                                 ;BE SET
2124
2125 010254  000240                          NOP
2126 010256  000240                          NOP
2127 010260  000401                          BR 4$                   ;NO TRAP
2128 010262  022626                  3$:     CMP (SP)+,(SP)+         ;
2129 010264  013703  177750          4$:     MOV CMR,R3              ;SAVE CMR CONTENTS
2130 010270  005037  177572                  CLR SR0
2131 010274  005037  172516                  CLR SR3                 ;DISABLE UNIBUS MAP
2132
     010300  000240                 25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     010302  000240                          NOP                     ;FOR  LOOP ON ERROR

2133 010304  032703  000010                  BIT #AM,R3              ;CHECK FOR 1
2134 010310  001040                          BNE 9$                  ;PASS
2135 010312  012737  000006  000004          MOV #6,4
2136 010320  005037  000006                  CLR 6
2137
2138 010324  013737  002056  047306          MOV CHRPAT,AMR210+2     ;PREPARE AMR210 AND CA210 FOR PRINTOUT
2139 010332  013737  002056  047302          MOV CHRPAT,CA210+2
2140 010340  013737  047332  047304          MOV FLTPAT,AMR210
2141 010346  013737  047332  047300          MOV FLTPAT,CA210
2142 010354  012737  000007  002052          MOV #7,LOOP
2143 010362  006237  047300          6$:     ASR CA210
2144 010366  006237  047304                  ASR AMR210
2145 010372  005337  002052                  DEC LOOP
2146 010376  001371                          BNE 6$
2147
     010400  104000                          ERROR                           ;ERROR
                                                                             ;-----
     010402  010400                          .-2
2148                                                                 ;AMR TESTS
2149                                                                 ;AM BIT DIT NOT READ 1
2150 010404  047300                          CA210                   ;PRINT CA<21:0> PATTERN USED
2151 010406  047304                          AMR210                  ;PRINT AMR<21:0> PAT. USED
2152 010410  000000                          0
2153                                 :::
```

```
2154 010412  006337  047332                9$:     ASL FLTPAT                ;NEXT PATTERN FOR UMPR01
2155 010416  032737  040000  047332              BIT #40000,FLTPAT         ;IF ADDRESS PATTERN 10000000 DON; FINISHED
2156 010424  001007                              BNE 8$
2157 010426  006337  170220                      ASL UMPR08                ;NEXT PATTERN FOR UMPR08
2158 010432  006337  002054                      ASL CMRPAT                ;NEXT PATTERN FOR CMR<15:10>
2159 010436  006337  002056                      ASL CHRPAT                ;NEXT PATTERN FOR CHR<15:0>
2160 010442  000653                              BR 1$
2161 010444  012737  000006  000004        8$:     MOV #6,4                  ;RESTORE VECTORS
2162 010452  005037  000006                      CLR 6
2163 010456  000240                        10$:    NOP                 ;END OF TEST
2164
2165 010460  005237  001464          T70:        INC $TESTN                ;UPDATE TEST ID
                                       ;;*****************************************************************
                                       .SBTTL
                                       .SBTTL TEST 70
                                       .SBTTL
                                       .SBTTL
2166                                   ;;;     VERIFY NO STUCK 1 OR 0 PA LINES; OR NO PA LINES
2167                                   ;;;             STUCK TO EACH OTHER.
2168                                   .SBTTL  PA<14:0> ADDRESS LINES FLOATING 1
2169                                   .SBTTL  CA<14:0> ADDRESS LINES FLOATING 1
2170                                   .SBTTL          AMR<14:0> FLOATING 1 PATTERN
2171                                   .SBTTL          AM BIT READS 1
2172                                   ;;*****************************************************************
2173
2174 010464  000004                              SCPCND                    ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                           ;ERROR/LOOP ON TEST
      010466  010476                             40$                       ;TEST START LOCATION
      010470  060004                             1$-40$+60000-14           ;LOOP ON ERROR START LOCATION
      010472  000000                             0                         ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      010474  060034                             25$-40$+60000-14          ;LOOP ON ERROR END LOCATION
      010476  012737  001015  177746        40$:    MOV #OFF,CCR              ;DISABLE CACHE
      010504  004437  002324                      JSR R4,RELCTL             ;LOCATE TEST CODE TO LOW CACHE SPACE
      010510  010626                             10$+2                     ;ADDRESS OF START OF NEXT TEST

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

2175 010512  012701  000001                      MOV #1,R1                 ;R1 CONTAINS IST FLOATING 1 PATTERN: 000001
2176 010516  010137  177752          1$:         MOV R1,CHR                ;LOAD AMR<15:0> FROM CHR<15:0>
2177 010522  105037  177751                      CLRB CMR+1                ;LOAD AMR<21:16> FROM CMR<15:10>
2178 010526  105037  177750                      CLRB CMR                  ;PRECONDITION AM BIT TO 0
2179 010532  022701  000001                      CMP #1,R1                 ;IF PATTERN IS 000001 USE TSTB
2180 010536  001002                              BNE 2$
2181 010540  105711                              TSTB (R1)
2182 010542  000401                              BR 3$
2183 010544  005711                  2$:         TST (R1)                  ;READ ADDRESS SPECIFIED IN R1
2184                                                                       ;WHICH WILL PLACE FLOATING 1 PATTERN ON ADDRESS LINE
2185                                                                       ;PA WILL BE SELECTED TO FEED CA LINES.
2186 010546                          3$:
2187
      010546  000240                 25$:        NOP                       ;INSTRUCTION 'JMP 1$' PLACED HERE
      010550  000240                             NOP                       ;FOR  LOOP ON ERROR

2188 010552  032737  000010  177750              BIT #AM,CMR               ;CHECK FOR 1
2189 010560  001015                              BNE 9$                    ;PASS
2190 010562  010137  047306                      MOV R1,AMR210+2           ;PREPARE PATTERN USED FOR AMR<21:0>
2191                                                                       ;FOR ERROR TYPE.
```

```
2192 010566  005037  047304                    CLR AMR210
2193 010572  010137  047302                    MOV R1,CA210+2          ;PREPARE PATTREN USED FOR CA<21:0>
2194 010576  005037  047300                    CLR CA210
2195
     010602  104000                            ERROR                           ;ERROR
                                                                              ;-----
     010604  010602                            .-2
2196                                                                          ;AMR TESTS
2197                                                                          ;AM BIT SHOULD HAVE READ 1 INDICATING A
2198                                                                          ;MATCH CONDITION.
2199 010606  047300                            CA210                         ;PRINT FLOATING 1 PATTERN USED FOR
2200                                                                          ;CACHE ADDRESS LINES CA<21:0>
2201 010610  047304                            AMR210                        ;PRINT   PATTERN USED FOR AMR<21:0> DATA
2202 010612  000000                            0
2203 010614  006301                    9$:     ASL R1                        ;NEXT FLOATING 1 PATTERN
2204 010616  032701  100000                    BIT #100000,R1                ;IS ADDRESS PATTERN 40000 DONE?
2205 010622  001735                            BEQ 1$                        ;NO; CONTINUE
2206 010624  000240                    10$:    NOP             ;END OF TEST
2207
2208
2209 010626  005237  001464            T71:    INC $TESTN                    ;UPDATE TEST ID
                                      ;;*************************************************************
                                      .SBTTL
                                      .SBTTL TEST 71
                                      .SBTTL
2210                                  .SBTTL
2211                                  .SBTTL          PA<21:15> FLOATING 1 PATTERN
2212                                  .SBTTL          CA<21:15> FLOATING 1 PATTERN
2213                                  .SBTTL          AMR<21:15> FLOATING 1 PATTERN
2214                                  .SBTTL
2215                                  ;;;         AFTER EACH FLOATING 1 PAT. CHECK AM BIT READS 1.
2216                                  ;;;         USE MEMORY MANAGEMENT.
2217                                  ;;*************************************************************
2218 010632  000004                            SCPCND                        ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                              ;ERROR/LOOP ON TEST
     010634  010644                            40$                           ;TEST START LOCATION
     010636  060022                            1$-40$+60000-14               ;LOOP ON ERROR START LOCATION
     010640  000000                            0                             ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     010642  060116                            25$-40$+60000-14              ;LOOP ON ERROR END LOCATION
     010644  012737  001015  177746    40$:    MOV #OFF,CCR                  ;DISABLE CACHE
     010652  004437  002324                    JSR R4,RELCTL                 ;LOCATE TEST CODE TO LOW CACHE SPACE
     010656  011156                            10$+2                         ;ADDRESS OF START OF NEXT TEST

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

2219 010660  012737  000002  002054    2$:     MOV #2,CMRPAT                 ;IST PATTERN FOR CMR<15:10>
2220 010666  012737  100000  002056            MOV #100000,CHRPAT            ;IST PATTERN FOR CHR<15:0>
2221
2222 010674  012737  001000  172350            MOV #1000,KPAR4               ;SETUP IST PATTRN. FOR PAGE ADDRESS FIELD
2223                                                                          ;KPAR4 CONTAINS THE FLOATING 1
2224                                                                          ;PATTERN AND REPRESENTS THE PAGE ADDRESS FIELD
2225                                                                          ;DATA USED BY MEM. MNGMNT. TO
2226                                                                          ;CONSTRUCT THE PHYSICAL ADDRESS.
2227                                                                          ;1000 IS THE 1ST FLOATING  1 PATTERN
2228                                                                          ;WHICH WILL BE CONSTRUCTED AS PHYS. ADDRESS 100000.
2229 010702  012737  060104  000004    1$:     MOV #6$-2$+60000,4                    ;ALLOW FOR NEX TRAP
```

```
2230 010710  012737  000340  000006          MOV #340,6
2231 010716  113737  002054  177751          MOVB CMRPAT,CMR+1       ;LOAD AMR<21:16> FROM CMR<15:10>
2232 010724  013737  002056  177752          MOV CHRPAT,CHR          ;LOAD AMR<15:0> FROM CHR<15:0>
2233 010732  012737  000001  177572          MOV #1,SR0              ;ENABLE MEM. MNGMNT.
2234 010740  012737  000020  172516          MOV #20,SR3             ;ENABLE 22-BIT MAPPING
2235 010746  105037  177750                  CLRB CMR                ;PRECONDITION AM BIT TO 0
2236 010752  005737  100000                  TST 100000              ;WILL CHOOSE KPAR4 FOR ADDRESSING.
2237                                                                 ;PHYSICAL ADDRESS WILL BE DETERMINED
2238                                                                 ;BY FLOATING PATTERN USED.
2239 010756  000240                          NOP
2240 010760  000240                          NOP
2241 010762  000401                          BR 7$                   ;NO TRAP
2242 010764  022626                  6$:     CMP (SP)+,(SP)+         ;ADJUST STACK
2243 010766  005037  177572          7$:     CLR SR0                 ;DISABLE MEM. MNGMNT.
2244 010772  005037  172516                  CLR SR3
2245
     010776  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     011000  000240                          NOP                     ;FOR  LOOP ON ERROR

2246 011002  032737  000010  177750          BIT #AM,CMR             ;CHECK FOR 1
2247 011010  001044                          BNE 9$                  ;PASS
2248 011012  012737  000006  000004          MOV #6,4
2249 011020  005037  000006                  CLR 6
2250 011024  005037  047306                  CLR AMR210+2            ;PREPARE PATTERN USED FOR AMR<21:0>
2251                                                                 ;AND CA<21:0> FOR TYPEOUT
2252 011030  005037  047302                  CLR CA210+2
2253 011034  013737  172350  047304          MOV KPAR4,AMR210
2254 011042  013737  172350  047300          MOV KPAR4,CA210
2255 011050  012737  000011  002052          MOV #9.,LOOP
2256 011056  006237  047304          5$:     ASR AMR210
2257 011062  006237  047300                  ASR CA210
2258 011066  042737  100000  047304          BIC #100000,AMR210
2259 011074  042737  100000  047300          BIC #100000,CA210
2260 011102  005337  002052                  DEC LOOP
2261 011106  001363                          BNE 5$
2262
2263
     011110  104000                          ERROR                           ;ERROR
                                                                             ;-----
     011112  011110                          .-2
2264                                                                 ;AMR TESTS
2265 011114  047300                          CA210                   ;PRINT FLOAT. ADDRESS PATTERN USED
2266                                                                 ;FOR CA<21:0>
2267 011116  047304                          AMR210                  ;PRINT PATTERN USED FOR AMR<21:0>
2268 011120  000000                          0
2269 011122  006337  172350          9$:     ASL KPAR4               ;NEXT FLOATING 1 PATTERN
2270 011126  103405                          BCS 8$                  ;IF PHYSICAL ADDRESS 10000000 DONE; FINISHED
2271 011130  006337  002054                  ASL CMRPAT              ;NEXT CMR PATTERN
2272 011134  006337  002056                  ASL CHRPAT              ;NEXT CHR PATTERN
2273 011140  000660                          BR 1$                   ;CONTINUE
2274 011142  012737  000006  000004  8$:     MOV #6,4                ;RESTORE VECTORS
2275 011150  005037  000006                  CLR 6
2276 011154  000240                  10$:    NOP             ;END OF TEST
2277
2278
2279
2280                          .SBTTL *
```

```
                                .SBTTL
                                .SBTTL *                        TAG STORE DATA TESTS- LOADING TAG STORE FROM
                                .SBTTL *                                             ADDRESS MATCH REGISTERS
                                .SBTTL
                                .SBTTL *
2291 011156  005237  001464    T72:            INC $TESTN              ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 72
                                .SBTTL
2292                            ;;*****************************************************************
2293                            .SBTTL
2294                            .SBTTL  ALL 0'S TO TAG STORE ADDRESS LOCATION 0000.
2295                            .SBTTL
2296                            ;;*****************************************************************
2297 011162  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     011164  011174                            40$                     ;TEST START LOCATION
     011166  070000                            1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     011170  000000                            0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     011172  070042                            25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     011174  012737  001015  177746    40$:    MOV #OFF,CCR            ;DISABLE CACHE
     011202  004437  002352                    JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     011206  011344                            10$+2                   ;ADDRESS OF START OF NEXT TEST

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

2298 011210  005037  177752    1$:     CLR CHR                 ;LOAD AMR<8:0> BY WRITING ALL 0'S TO CHR<8:0>
2299 011214  112737  000003  177750    MOVB #HODO+TDAR,CMR             ;ALLOWS CACHE TAG FIELD BITS TO BE
2300                                                            ;WRITTEN TO CHR<15:07> ONLY DURING
2301                                                            ;THE DESTINATION MEMORY ACCESS
2302                                                            ;OF AN INSTRUCTION
2303                                                    ;ENABLE CACHE TAG FIELD TO BE WRITTEN
2304                                                            ;INTO FROM AMR<8:0>
2305 011222  012737  000015  177746    MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE TAG STORE
2306 011230  005737  040000            TST 40000
2307 011234  005737  060000            TST 60000               ;WRITE INTO TAG STORE
2308 011240  005737  060000            TST 60000               ;WRITE TAG FIELD DATA FROM CACHE ADDRESS
2309                                                            ;LOCATION 0000 INTO CHR.
2310 011244  013737  177752  047310    MOV CHR,CHR157          ;SAVE CHR DATA
2311
     011252  000240            25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     011254  000240                    NOP                     ;FOR  LOOP ON ERROR

2312 011256  105037  177750            CLRB CMR                        ;DISABLE MAINTENANCE MODE
2313 011262  012737  001015  177746    MOV #OFF,CCR
2314 011270  042737  000177  047310    BIC #177,CHR157         ;PREPARE CHR157 FOR ERROR CHECK
2315 011276  005737  047310            TST CHR157              ;BITS <15:07> SHOULD BE ALL 0'S
2316 011302  001417                    BEQ 10$                 ;PASS
2317 011304  012737  000007  002052    MOV #7,LOOP             ;ERROR;PREPARE CHR157 FOR TYPEOUT
2318 011312  006237  047310    2$:     ASR CHR157
```

```
2319 011316  042737  100000  047310          BIC #100000,CHR157
2320 011324  005337  002052                  DEC LOOP
2321 011330  001370                          BNE 2$
2322
     011332  104000                          ERROR                          ;ERROR
                                                                            ;-----
     011334  011332                          .-2
2323                                                    ;TAG STORE DATA TESTS
2324                                                    ;READING TAGD<21:13> THRU CHR<15:07>
2325                                                    ;DID NOT RESULT IN ALL 0'S.
2326 011336  047310                          CHR157                         ;PRINT CHR<15:07>
2327 011340  000000                          0
2328 011342  000240                  10$:    NOP                ;END OF TEST
2329
2330
2331 011344  005237  001464          T73:    INC $TESTN                     ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 73
                                    .SBTTL
2332                                ;;*****************************************************************
2333                                .SBTTL
2334                                .SBTTL  ALL 1'S TO TAG STORE ADDRESS LOCATION 0000.
2335                                .SBTTL
2336                                ;;*****************************************************************
2337 011350  000004                          SCPCND                         ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                            ;ERROR/LOOP ON TEST
     011352  011362                          40$                            ;TEST START LOCATION
     011354  070000                          1$-40$+70000-14                ;LOOP ON ERROR START LOCATION
     011356  000000                          0                              ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     011360  070044                          25$-40$+70000-14               ;LOOP ON ERROR END LOCATION
     011362  012737  001015  177746  40$:    MOV #OFF,CCR                   ;DISABLE CACHE
     011370  004437  002352                  JSR R4,RELCTH                  ;LOCATE TEST CODE TO HIGH CACHE SPACE
     011374  011536                          10$+2                          ;ADDRESS OF START OF NEXT TEST

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

2338 011376  012737  177777  177752  1$:     MOV #-1,CHR                    ;LOAD AMR<8:0> BY WRITING ALL 1'S TO CHR<8:0>
2339 011404  112737  000003  177750          MOVB #HODO+TDAR,CMR                     ;ALLOWS CACHE TAG FIELD BITS TO BE
2340                                                    ;WRITTEN TO CHR<15:07> ONLY DURING
2341                                                    ;THE DESTINATION MEMORY ACCESS
2342                                                    ;OF AN INSTRUCTION
2343                                            ;ENABLE CACHE TAG FIELD TO BE WRITTEN
2344                                                    ;INTO FROM AMR<8:0>
2345 011412  012737  000015  177746          MOV #15,CCR                    ;NO UCB SO AS TO WRITE ENABLE
2346 011420  005737  040000                  TST 40000
2347 011424  005737  060000                  TST 60000                      ;WRITE INTO TAG STORE
2348 011430  005737  060000                  TST 60000                      ;WRITE TAG FIELD DATA FROM CACHE ADDRESS
2349                                                    ;LOCATION 0000 INTO CHR.
2350 011434  013737  177752  047310          MOV CHR,CHR157                 ;SAVE CHR DATA
2351
     011442  000240                  25$:    NOP                            ;INSTRUCTION 'JMP 1$' PLACED HERE
     011444  000240                          NOP                            ;FOR  LOOP ON ERROR

2352 011446  105037  177750                  CLRB CMR                               ;DISABLE MAINTENANCE MODE
2353 011452  012737  001015  177746          MOV #OFF,CCR
```

```
2354 011460  042737  000177  047310          BIC #177,CHR157
2355 011466  022737  177600  047310          CMP #177600,CHR157      ;BITS <15:07> SHOULD BE ALL 1'S
2356 011474  001417                          BEQ 10$                 ;PASS
2357 011476  012737  000007  002052          MOV #7,LOOP             ;ERROR;PREPARE CHR157 FOR TYPEOUT
2358 011504  006237  047310            2$:   ASR CHR157
2359 011510  042737  100000  047310          BIC #100000,CHR157
2360 011516  005337  002052                  DEC LOOP
2361 011522  001370                          BNE 2$
2362
     011524  104000                          ERROR                           ;ERROR
                                                                            ;-----
     011526  011524                          .-2
2363                                        ;TAG STORE DATA TESTS
2364                                        ;READING TAGD<21:13> THRU CHR<15:07>
2365                                        ;DID NOT RESULT IN ALL 1'S.
2366 011530  047310                        CHR157                  ;PRINT CHR<15:07>
2367 011532  000000                        0
2368 011534  000240                  10$:  NOP             ;END OF TEST
2369
2370
2371 011536  005237  001464          T74:  INC $TESTN                      ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 74
                                    .SBTTL
2372                                ;;*****************************************************************
2373                                .SBTTL
2374                                .SBTTL  FLOAT 1 ACROSS 0'S TO TAG STORE ADDRESS LOCATION 0000.
2375                                .SBTTL
2376                                ;;*****************************************************************
2377 011542  000004                        SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                            ;ERROR/LOOP ON TEST
     011544  011554                        40$                             ;TEST START LOCATION
     011546  070006                        1$-40$+70000-14                 ;LOOP ON ERROR START LOCATION
     011550  000000                        0                               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     011552  070052                        25$-40$+70000-14                ;LOOP ON ERROR END LOCATION
     011554  012737  001015  177746  40$:   MOV #OFF,CCR                   ;DISABLE CACHE
     011562  004437  002352                JSR R4,RELCTH                   ;LOCATE TEST CODE TO HIGH CACHE SPACE
     011566  011746                        10$+2                           ;ADDRESS OF START OF NEXT TEST

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

2378 011570  012737  000001  047314          MOV #1,CHR80                    ;1ST FLOATING 1 PATTERN:001
2379 011576  012737  000015  177746    1$:   MOV #15,CCR                     ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2380 011604  013737  047314  177752          MOV CHR80,CHR                   ;LOAD AMR<8:0> VIA CHR<8:0> WITH
2381                                                                        ;FLOATING 1 PATTERN
2382 011612  112737  000003  177750          MOVB #HODO+TDAR,CMR                     ;ALLOWS CACHE TAG FIELD BITS TO BE
2383                                                                        ;WRITTEN TO CHR<15:07> ONLY DURING
2384                                                                        ;THE DESTINATION MEMORY ACCESS
2385                                                                        ;OF AN INSTRUCTION
2386                                                        ;ENABLE CACHE TAG FIELD TO BE WRITTEN
2387                                                                        ;INTO FROM AMR<8:0>
2388 011620  005737  040000                TST 40000
2389 011624  005737  060000                TST 60000                       ;WRITE INTO TAG STORE
2390 011630  005737  060000                TST 60000                       ;WRITE TAG FIELD DATA FROM CACHE ADDRESS
2391                                                                        ;LOCATION 0000 INTO CHR.
```

```
2392 011634  013737  177752  047310                  MOV CHR,CHR157          ;SAVE CHR DATA
2393
     011642  000240                          25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     011644  000240                                   NOP                     ;FOR  LOOP ON ERROR

2394 011646  105037  177750                          CLRB CMR                        ;DISABLE MAINTENANCE MODE
2395 011652  012737  001015  177746                  MOV #OFF,CCR            ;DISABLE CACHE
2396 011660  012737  000007  002052                  MOV #7,LOOP             ;PREPARE CHR157 FOR COMPARISON
2397 011666  006237  047310                  3$:     ASR CHR157
2398 011672  042737  100000  047310                  BIC #100000,CHR157
2399 011700  005337  002052                          DEC LOOP
2400 011704  001370                                  BNE 3$
2401 011706  023737  047314  047310                  CMP CHR80,CHR157        ;CHECK FOR CORRECT PATTERN
2402 011714  001405                                  BEQ 9$                  ;PASS
2403
     011716  104000                                  ERROR                           ;ERROR
                                                                                      ;-----
     011720  011716                                  .-2
2404                                                                          ;TAG STORE DATA TESTS
2405                                                                          ;READING CHR<15:07> FOR TAGD<21:13>
2406                                                                          ;DID NOT RESULT IN CORRECT FLOATING
2407                                                                          ;1 PATTERN.
2408 011722  047310                                  CHR157                  ;PRINT CHR<15:07>
2409 011724  047314                                  CHR80                   ;PRINT FLOATING 1 PATTERN LOADED
2410                                                                          ;INTO CHR<8:0>
2411 011726  000000                                  0
2412 011730  006337  047314                  9$:     ASL CHR80               ;NEXT PATTERN
2413 011734  032737  001000  047314                  BIT #1000,CHR80         ;IF PATTERN 400 DONE;FINISHED
2414 011742  001715                                  BEQ 1$                  ;IF NOT, NEXT PASS
2415 011744  000240                          10$:    NOP             ;END OF TEST
2416
2417
2418 011746  005237  001464          T75:            INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 75
                                     .SBTTL
2419                                 .SBTTL
2420                                 .SBTTL  WRITE AND READ 0'S TO ALL LOW CACHE TAG STORE ADDRESS LOCATIONS
2421                                 .SBTTL          (0000 TO 3777)
2422                                 .SBTTL
2423                                 ;;*****************************************************************
2424 011752  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                              ;ERROR/LOOP ON TEST
     011754  011764                                  40$                     ;TEST START LOCATION
     011756  070014                                  1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     011760  000000                                  0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     011762  070044                                  25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     011764  012737  001015  177746          40$:    MOV #OFF,CCR            ;DISABLE CACHE
     011772  004437  002352                          JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     011776  012166                                  10$+2                   ;ADDRESS OF START OF NEXT TEST

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

2425 012000  005037  177752                          CLR CHR                 ;LOAD AMR<8:0> BY WRITING ALL 0'S TO CHR<8:0>
2426 012004  012705  060000                          MOV #60000,R5           ;ADDRESS 60000 INTO R5
```

```
2427 012010  012703  040000                    MOV #40000,R3          ;ADDRESS 40000 INTO R3
2428 012014  012737  000015  177746      1$:    MOV #15,CCR            ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2429 012022  112737  000003  177750           MOVB #HODO+TDAR,CMR              ;ALLOWS CACHE TAG FIELD BITS TO BE
2430                                                                   ;WRITTEN TO CHR<15:07> ONLY DURING
2431                                                                   ;THE DESTINATION MEMORY ACCESS
2432                                                                   ;OF AN INSTRUCTION
2433                                                         ;ENABLE CACHE TAG FIELD TO BE WRITTEN
2434                                                                   ;INTO FROM AMR<8:0>
2435 012030  005713                            TST (R3)               ;
2436 012032  005715                            TST (R5)               ;WRITE INTO TAG STORE
2437 012034  005715                            TST (R5)               ;WRITE TAG STORE DATA INTO CHR FROM CACHE ADDRESS
2438                                                                   ;LOCATION SPECIFIED BY CA<12:1> IN R5.
2439 012036  013737  177752  047310           MOV CHR,CHR157         ;SAVE CHR DATA
2440
     012044  000240                    25$:    NOP                    ;INSTRUCTION 'JMP 1$' PLACED HERE
     012046  000240                            NOP                    ;FOR  LOOP ON ERROR

2441 012050  105037  177750                    CLRB CMR                         ;DISABLE MAINTENANCE MODE
2442 012054  012737  001015  177746           MOV #OFF,CCR           ;DISABLE CACHE
2443 012062  042737  000177  047310           BIC #177,CHR157        ;PREPARE CHR157 FOR ERROR CHECK
2444 012070  005737  047310                    TST CHR157             ;BITS <15:07> SHOULD BE ALL 0'S
2445 012074  001424                           BEQ 9$                 ;PASS
2446 012076  010537  047302                    MOV R5,CA210+2         ;SAVE CACHE ADDRESS USED: CA<21:0>
2447 012102  005037  047300                    CLR CA210
2448 012106  012737  000007  002052           MOV #7,LOOP            ;ERROR;PREPARE CHR157 FOR TYPEOUT
2449 012114  006237  047310              4$:   ASR CHR157
2450 012120  042737  100000  047310           BIC #100000,CHR157
2451 012126  005337  002052                    DEC LOOP
2452 012132  001370                           BNE 4$
2453
     012134  104000                           ERROR                                ;ERROR
                                                                                  ;-----
     012136  012134                           .-2
2454                                                                   ;TAG STORE DATA TESTS
2455                                                                   ;READING TAGD<21:13> THRU CHR<15:07>
2456                                                                   ;DID NOT RESULT IN ALL 0'S.
2457 012140  047310                            CHR157                 ;PRINT CHR<15:07>
2458 012142  047300                            CA210                  ;PRINT CA<21:0> ADDRESS USED
2459                                                                   ;BITS <12:1> IS THE CACHE TAG STORE ADDRESS
2460                                                                   ;LOCATION FAILURE
2461 012144  000000                            0
2462 012146  062705  000002              9$:   ADD #2,R5              ;NEXT CACHE STORE LOCATION
2463 012152  062703  000002                    ADD #2,R3
2464 012156  020527  070000                    CMP R5,#70000          ;HAVE ALL LOW CACHE ADDRESS LOCATIONS BEEN CHECKED?
2465 012162  001314                           BNE 1$                 ;NO
2466 012164  000240                     10$:   NOP                ;END OF TEST
2467
2468
2469 012166  005237  001464           T76:   INC $TESTN                   ;UPDATE TEST ID
                                      ;;*****************************************************************
                                      .SBTTL
                                      .SBTTL TEST 76
                                      .SBTTL
2470                                  .SBTTL
2471                                  .SBTTL  WRITE AND READ 1'S TO ALL LOW CACHE TAG STORE ADDRESS LOCATIONS
2472                                  .SBTTL        (0000 TO 3777)
2473                                  .SBTTL
```

```
2474                                ;;*****************************************************************
2475 012172  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
     012174  012204                        40$                     ;TEST START LOCATION
     012176  070016                        1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     012200  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     012202  070046                        25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     012204  012737  001015  177746  40$:  MOV #OFF,CCR            ;DISABLE CACHE
     012212  004437  002352                JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     012216  012412                        10$+2                   ;ADDRESS OF START OF NEXT TEST

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

2476 012220  012737  177777  177752        MOV #-1,CHR             ;LOAD AMR<8:0> BY WRITING ALL 1'S TO CHR<8:0>
2477 012226  012705  060000                MOV #60000,R5           ;ADDRESS 60000 INTO R5
2478 012232  012703  040000                MOV #40000,R3           ;ADDRESS 40000 INTO R3
2479 012236  012737  000015  177746  1$:   MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2480 012244  112737  000003  177750        MOVB #HODO+TDAR,CMR             ;ALLOWS CACHE TAG FIELD BITS TO BE
2481                                                                ;WRITTEN TO CHR<15:07> ONLY DURING
2482                                                                ;THE DESTINATION MEMORY ACCESS
2483                                                                ;OF AN INSTRUCTION
2484                                                        ;ENABLE CACHE TAG FIELD TO BE WRITTEN
2485                                                                ;INTO FROM AMR<8:0>
2486 012252  005713                        TST (R3)                ;
2487 012254  005715                        TST (R5)                ;WRITE INTO TAG STORE
2488 012256  005715                        TST (R5)                ;WRITE TAG STORE DATA INTO CHR FROM CACHE ADDRESS
2489                                                                ;LOCATION SPECIFIED BY CA<12:1> IN R5
2490 012260  013737  177752  047310        MOV CHR,CHR157          ;SAVE CHR DATA
2491
     012266  000240                25$:   NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     012270  000240                        NOP                     ;FOR  LOOP ON ERROR

2492 012272  105037  177750                CLRB CMR                        ;DISABLE MAINTENANCE
2493 012276  012737  001015  177746        MOV #OFF,CCR
2494 012304  042737  000177  047310        BIC #177,CHR157
2495 012312  022737  177600  047310        CMP #177600,CHR157      ;BITS <15:07> SHOULD BE ALL 1'S
2496 012320  001424                        BEQ 9$                  ;PASS
2497 012322  010537  047302                MOV R5,CA210+2          ;SAVE CACHE ADDRESS USED: CA<21:0>
2498 012326  005037  047300                CLR CA210
2499 012332  012737  000007  002052        MOV #7,LOOP             ;ERROR;PREPARE CHR157 FOR TYPEOUT
2500 012340  006237  047310  4$:   ASR CHR157
2501 012344  042737  100000  047310        BIC #100000,CHR157
2502 012352  005337  002052                DEC LOOP
2503 012356  001370                        BNE 4$
2504
     012360  104000                        ERROR                           ;ERROR
                                                                        ;-----
     012362  012360                        .-2
2505                                                            ;TAG STORE DATA TESTS
2506                                                            ;READING TAGD<21:13> THRU CHR<15:07>
2507                                                            ;DID NOT RESULT IN ALL 1'S.
2508 012364  047300                        CA210                   ;PRINT CACHE ADDRESS CA<21:0>
2509 012366  047310                        CHR157                  ;PRINT CHR<15:07>
2510 012370  000000                        0
2511 012372  062705  000002          9$:   ADD #2,R5               ;NEXT CACH LOCATION
2512 012376  062703  000002                ADD #2,R3
```

```
2513 012402  020527  070000                    CMP R5,#70000          ;HAVE ALL LOCATIONS BEEN DONE?
2514 012406  001313                            BNE 1$                 ;NO
2515 012410  000240                    10$:    NOP                ;END OF TEST
2516
2517
2518
2519 012412  005237  001464            T77:    INC $TESTN             ;UPDATE TEST ID
                                       ;;*****************************************************************
                                       .SBTTL
                                       .SBTTL TEST 77
                                       .SBTTL
2520                                   .SBTTL
2521                                   .SBTTL  WRITE AND READ 0'S TO ALL HI CACHE TAG STORE ADDRESS LOCATIONS
2522                                   .SBTTL          (4000 TO 7777)
2523                                   .SBTTL
2524                                   ;;*****************************************************************
2525 012416  000004                            SCPCND                 ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                      ;ERROR/LOOP ON TEST
     012420  012430                            40$                    ;TEST START LOCATION
     012422  060014                            1$-40$+60000-14        ;LOOP ON ERROR START LOCATION
     012424  000000                            0                      ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     012426  060044                            25$-40$+60000-14       ;LOOP ON ERROR END LOCATION
     012430  012737  001015  177746    40$:    MOV #OFF,CCR           ;DISABLE CACHE
     012436  004437  002324                    JSR R4,RELCTL          ;LOCATE TEST CODE TO LOW CACHE SPACE
     012442  012632                            10$+2                  ;ADDRESS OF START OF NEXT TEST

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

2526 012444  005037  177752                    CLR CHR                ;LOAD AMR<8:0> BY WRITING ALL 0'S TO CHR<8:0>
2527 012450  012705  070000                    MOV #70000,R5          ;ADDRESS 70000 INTO R5
2528 012454  012703  050000                    MOV #50000,R3          ;ADDRESS 50000 INTO R3
2529 012460  012737  000015  177746    1$:     MOV #15,CCR            ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2530 012466  112737  000003  177750            MOVB #HODO+TDAR,CMR            ;ALLOWS CACHE TAG FIELD BITS TO BE
2531                                                                  ;WRITTEN TO CHR<15:07> ONLY DURING
2532                                                                  ;THE DESTINATION MEMORY ACCESS
2533                                                                  ;OF AN INSTRUCTION
2534                                                  ;ENABLE CACHE TAG FIELD TO BE WRITTEN
2535                                                                  ;INTO FROM AMR<8:0>
2536 012474  005713                            TST (R3)               ;
2537 012476  005715                            TST (R5)               ;WRITE INTO TAG STORE
2538 012500  005715                            TST (R5)               ;WRITE TAG STORE DATA INTO CHR FROM CACHE ADDRESS
2539                                                                  ;LOCATION SPECIFIED BY CA<12:1> IN R5.
2540 012502  013737  177752  047310            MOV CHR,CHR157         ;SAVE CHR DATA
2541
     012510  000240                    25$:    NOP                    ;INSTRUCTION 'JMP 1$' PLACED HERE
     012512  000240                            NOP                    ;FOR  LOOP ON ERROR

2542 012514  105037  177750                    CLRB CMR                       ;DISABLE MAINTENANCE MODE
2543 012520  012737  001015  177746            MOV #OFF,CCR           ;DISABLE CACHE
2544 012526  042737  000177  047310            BIC #177,CHR157        ;PREPARE CHR157 FOR ERROR CHECK
2545 012534  005737  047310                    TST CHR157             ;BITS <15:07> SHOULD BE ALL 0'S
2546 012540  001424                            BEQ 9$                 ;PASS
2547 012542  010537  047302                    MOV R5,CA210+2         ;SAVE CACHE ADDRESS USED: CA<21:0>
2548 012546  005037  047300                    CLR CA210
2549 012552  012737  000007  002052            MOV #7,LOOP            ;ERROR;PREPARE CHR157 FOR TYPEOUT
2550 012560  006237  047310            4$:     ASR CHR157
```

```
2551 012564  042737  100000  047310          BIC #100000,CHR157
2552 012572  005337  002052                  DEC LOOP
2553 012576  001370                          BNE 4$
2554
     012600  104000                          ERROR                          ;ERROR
                                                                           ;-----
     012602  012600                          .-2
2555                                    ;TAG STORE DATA TESTS
2556                                            ;READING TAGD<21:13> THRU CHR<15:07>
2557                                            ;DID NOT RESULT IN ALL 0'S.
```

```
2559 012604  047310                          CHR157          ;PRINT CHR<15:07>
2560 012606  047300                          CA210           ;PRINT CA<21:0> ADDRESS USED
2561                                                         ;BITS <12:1> IS THE CACHE TAG STORE ADDRESS
2562                                                         ;LOCATION FAILURE
2563 012610  000000                          0
2564 012612  062705  000002            9$:   ADD #2,R5       ;NEXT CACHE STORE LOCATION
2565 012616  062703  000002                  ADD #2,R3
2566 012622  020527  100000                  CMP R5,#100000  ;HAVE ALL HI CACHE ADDRESS LOCATIONS BEEN CHECKED?
2567 012626  001314                          BNE 1$          ;NO
```

```
2569 012630  000240                    10$:    NOP             ;END OF TEST
2570
2571
2572 012632  005237  001464          T100:   INC $TESTN              ;UPDATE TEST ID
                                      ;;*****************************************************************
                                      .SBTTL
                                      .SBTTL TEST 100
                                      .SBTTL
2573                                  .SBTTL -
2574                                  .SBTTL  WRITE AND READ 1'S TO ALL HI CACHE TAG STORE ADDRESS LOCATIONS
2575                                  .SBTTL       (4000 TO 7777)
2576                                  .SBTTL
2577                                  ;;*****************************************************************
2578 012636  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                      ;ERROR/LOOP ON TEST
     012640  012650                          40$                     ;TEST START LOCATION
     012642  060016                          1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
     012644  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     012646  060046                          25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
     012650  012737  001015  177746  40$:    MOV #OFF,CCR            ;DISABLE CACHE
     012656  004437  002324                  JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
     012662  013056                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

2579 012664  012737  177777  177752          MOV #-1,CHR             ;LOAD AMR<8:0> BY WRITING ALL 1'S TO CHR<8:0>
2580 012672  012705  070000                  MOV #70000,R5           ;ADDRESS 70000 INTO R5
2581 012676  012703  050000                  MOV #50000,R3           ;ADDRESS 50000 INTO R3
2582 012702  012737  000015  177746  1$:     MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2583 012710  112737  000003  177750          MOVB #HODO+TDAR,CMR             ;ALLOWS CACHE TAG FIELD BITS TO BE
2584                                  ;WRITTEN TO CHR<15:07> ONLY DURING
2585                                  ;THE DESTINATION MEMORY ACCESS
2586                                  ;OF AN INSTRUCTION
2587                                  ;ENABLE CACHE TAG FIELD TO BE WRITTEN
2588                                  ;INTO FROM AMR<8:0>
2589 012716  005713                  TST (R3)                ;
2590 012720  005715                  TST (R5)                ;WRITE INTO TAG STORE
2591 012722  005715                  TST (R5)                ;WRITE TAG STORE DATA INTO CHR FROM CACHE ADDRESS
2592                                                          ;LOCATION SPECIFIED BY CA<12:1> IN R5
2593 012724  013737  177752  047310          MOV CHR,CHR157          ;SAVE CHR DATA
2594
     012732  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     012734  000240                          NOP                     ;FOR  LOOP ON ERROR

2595 012736  105037  177750                  CLRB CMR                        ;DISABLE MAINTENANCE
2596 012742  012737  001015  177746          MOV #OFF,CCR
2597 012750  042737  000177  047310          BIC #177,CHR157
2598 012756  022737  177600  047310          CMP #177600,CHR157      ;BITS <15:07> SHOULD BE ALL 1'S
2599 012764  001424                          BEQ 9$                  ;PASS
2600 012766  010537  047302                  MOV R5,CA210+2          ;SAVE CACHE ADDRESS USED: CA<21:0>
2601 012772  005037  047300                  CLR CA210
2602 012776  012737  000007  002052          MOV #7,LOOP             ;ERROR;PREPARE CHR157 FOR TYPEOUT
2603 013004  006237  047310  4$:     ASR CHR157
2604 013010  042737  100000  047310          BIC #100000,CHR157
2605 013016  005337  002052                  DEC LOOP
2606 013022  001370                          BNE 4$
```

```
2607
     013024  104000                          ERROR                           ;ERROR
                                             ;-----
     013026  013024                          .-2
2608                                     ;TAG STORE DATA TESTS
2609                                             ;READING TAGD<21:13> THRU CHR<15:07>
2610                                             ;DID NOT RESULT IN ALL 1'S.
2611 013030  047300                          CA210                           ;PRINT CACHE ADDRESS CA<21:0>
2612 013032  047310                          CHR157                          ;PRINT CHR<15:07>
2613 013034  000000                          0
2614 013036  062705  000002            9$:   ADD #2,R5                       ;NEXT CACH LOCATION
2615 013042  062703  000002                  ADD #2,R3
2616 013046  020527  100000                  CMP R5,#100000                  ;HAVE ALL LOCATIONS BEEN DONE?
2617 013052  001313                          BNE 1$                          ;NO
2618 013054  000240                    10$:  NOP                       ;END OF TEST
2619
2620
2621
2622
2623                                 .SBTTL *
2624                                 .SBTTL
2625                                 .SBTTL *                    TAG STORE TESTS- LOADING TAG STORE FROM CACHE ADDRESS
2626                                 .SBTTL *                                     LINES CA<21:13>
2627                                 .SBTTL
2628                                 .SBTTL *
2629
2630
2631
2632
2633
2634 013056  005237  001464          T101:       INC $TESTN                  ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 101
                                     .SBTTL
2635                                 .SBTTL
2636                                 .SBTTL CHECK LOADING OF TAG STORE DATA(TAG WRTD<21:13>) FROM
2637                                 .SBTTL     CACHE ADDRESS LINES CA<21:13>.
2638                                 .SBTTL
2639                                 .SBTTL  WRITE ALL 0'S IN TAG STORE LOCATION 0000 FROM CA<21:13>
2640                                 .SBTTL
2641                                 ;;*****************************************************************
2642 013062  000004                          SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                             ;ERROR/LOOP ON TEST
     013064  013074                          40$                             ;TEST START LOCATION
     013066  070000                          1$-40$+70000-14                 ;LOOP ON ERROR START LOCATION
     013070  000000                          0                               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     013072  070036                          25$-40$+70000-14                ;LOOP ON ERROR END LOCATION
     013074  012737  001015  177746    40$:  MOV #OFF,CCR                    ;DISABLE CACHE
     013102  004437  002352                  JSR R4,RELCTH                   ;LOCATE TEST CODE TO HIGH CACHE SPACE
     013106  013240                          10$+2                           ;ADDRESS OF START OF NEXT TEST

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

2643 013110  112737  000002  177750    1$:   MOVB #HODG,CMR                  ;ALLOWS CACHE TAG FIELD BITS TO BE
2644                                                                         ;WRITTEN TO CHR<15:07> ONLY DURING
```

```
2645                                                    ;THE DESTINATION MEMORY ACCESS
2646                                                    ;OF AN INSTRUCTION
2647 013116  012737  000015  177746          MOV #15,CCR               ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2648 013124  005737  040000                  TST 40000
2649 013130  005737  000000                  TST 0           ;WRITE ALL 0'S INTO TAG STORE LOCATION 0000
2650                                                    ;FROM CACHE ADDRESS CA<21:13>
2651 013134  005737  000000                  TST 0           ;WRITE TAG STORE DATA FROM  LOCATION
2652                                                    ;0000 INTO CHR<15:07>.
2653 013140  013737  177752  047310          MOV CHR,CHR157            ;SAVE CHR DATA
2654
     013146  000240                  25$:    NOP                       ;INSTRUCTION 'JMP 1$' PLACED HERE
     013150  000240                          NOP                       ;FOR  LOOP ON ERROR

2655 013152  105037  177750                  CLRB CMR                          ;DISABLE MAINTENANCE MODE
2656 013156  012737  001015  177746          MOV #OFF,CCR              ;DISABLE CACHE
2657 013164  042737  000177  047310          BIC #177,CHR157           ;PREPARE CHR157 FOR ERROR CHECK
2658 013172  005737  047310                  TST CHR157                ;BITS <15:07> SHOULD BE ALL 0'S
2659 013176  001417                          BEQ 10$                   ;PASS
2660 013200  012737  000007  002052          MOV #7,LOOP               ;ERROR;PREPARE CHR157 FOR TYPEOUT
2661 013206  006237  047310          2$:     ASR CHR157
2662 013212  042737  100000  047310          BIC #100000,CHR157
2663 013220  005337  002052                  DEC LOOP
2664 013224  001370                          BNE 2$
2665
     013226  104000                          ERROR                             ;ERROR
                                                                              ;-----
     013230  013226                          .-2
2666                                                    ;TAG STORE DATA TESTS
2667                                                    ;READING TAGD<21:13> THRU CHR<15:07>
2668                                                    ;DID NOT RESULT IN ALL 0'S.
2669 013232  047310                          CHR157                    ;PRINT CHR<15:07>
2670 013234  000000                          0
2671 013236  000240                  10$:    NOP             ;END OF TEST
2672
2673
2674
2675
2676
2677
2678
2679
2680 013240  005237  001464          T102:           INC $TESTN                ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 102
                                     .SBTTL
2681                                 .SBTTL
2682                                 .SBTTL       WRITE FLOATING 1 ACROSS 0'S INTO TAG STORE LOCATION 0000
2683                                 .SBTTL       FROM CA<21:13> USING AVAILABLE MEMORY.
2684                                 ;;;             PROCEDURE:  STARTING AT 8K BOUNDARY(ADDR. 20000) CHECK
2685                                 ;;;                         FOR AVAILABLE FLOATING ADDRESS UP TO ADDR. 10000000
2686                                 ;;;                         WHEN THE FLOATING ADDRESS EXISTS PERFORM THE TEST.
2687                                 ;;*****************************************************************
2688 013244  000004                          SCPCND                    ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                       ;ERROR/LOOP ON TEST
     013246  013256                          40$                       ;TEST START LOCATION
     013250  070006                          1$-40$+70000-14           ;LOOP ON ERROR START LOCATION
```

```
        013252  000000                                  0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
        013254  070100                                  25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
        013256  012737  001015  177746          40$:    MOV #OFF,CCR            ;DISABLE CACHE
        013264  004437  002352                          JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
        013270  013556                                  10$+2                   ;ADDRESS OF START OF NEXT TEST

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

  2689  013272  012737  000200  172350          2$:     MOV #200,KPAR4          ;KPAR4 CONTAINS THE FLOATING 1 PATTERN
  2690                                                                          ;AND REPRESENTS THE THE PAGE ADDRESS FIELD
  2691                                                                          ;DATA USED BY MEMORY MNGMNT. TO CONSTRUCT
  2692                                                                          ;THE PHYSICAL ADDRESS.  200 IS THE 1ST
  2693                                                                          ;FLOATING 1 PATTERN WHICH WILL BE CONSTRUCTED
  2694                                                                          ;TO ADDRESS 20000.
  2695  013300  012737  070240  000004          1$:     MOV #7$-2$+70000,4              ;ALLOW FOR NEX TRAP
  2696  013306  012737  000340  000006                  MOV #340,6
  2697  013314  112737  000002  177750                  MOVB #HODO,CMR          ;ALLOWS CACHE TAG STORE TO BE WRITTEN
  2698                                                                          ;TO CHR<15:07> ONLY DURING THE DESTINATION
  2699                                                                          ;MEMORY ACCESS OF AN INSTRUCTION.
  2700  013322  012737  000001  177572                  MOV #1,SR0              ;ENABLE MEMORY MNGMNT.
  2701  013330  012737  000020  172516                  MOV #20,SR3             ;ENABLE 22-BIT MAPPING
  2702  013336  012737  000015  177746                  MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
  2703  013344  005737  040000                          TST 40000               ;
  2704  013350  005737  100000                          TST 100000              ;CHOOSES KPAR4 FOR ADDRESSING. PHYSICAL
  2705                                                                          ;ADDRESS WILL BE DETERMINED BY FLOATING
  2706                                                                          ;PATTERN USED IN KPAR4. TAG STORE WILL
  2707                                                                          ;BE WRITTEN WITH DATA PLACED ON CA<21:13> ADDRESS LI
  2708  013354  000240                                  NOP
  2709  013356  000240                                  NOP                     ;NO TRAP
  2710  013360  005737  100000                          TST 100000              ;WRITE TAG STOR E DATA FROM LOCATION
  2711                                                                          ;0000 INTO CHR<15:07>.
  2712  013364  013737  177752  047310                  MOV CHR,CHR157          ;SAVE CHR INFO.
  2713
        013372  000240                          25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
        013374  000240                                  NOP                     ;FOR  LOOP ON ERROR

  2714  013376  005037  177572                          CLR SR0                 ;DISABLE MEM MNGMENT.
  2715  013402  005037  172516                          CLR SR3
  2716  013406  012737  001015  177746                  MOV #OFF,CCR            ;DISABLE CACHE
  2717  013414  105037  177750                          CLRB CMR                ;DISABLE MAINTENANCE
  2718  013420  042737  000177  047310                  BIC #177,CHR157
  2719  013426  023737  172350  047310                  CMP KPAR4,CHR157        ;IS THERE ERROR?
  2720  013434  001437                                  BEQ 9$                  ;PASS
  2721  013436  012737  000006  000004                  MOV #6,4
  2722  013444  005037  000006                          CLR 6
  2723  013450  013737  172350  047312                  MOV KPAR4,CA2113        ;SAVE PATTERN USED FOR CA<21:13>.
  2724  013456  012737  000007  002052                  MOV #7,LOOP             ;PREPARE CHR157 AND CA2113 FOR ERROR PRINT
  2725  013464  006237  047310                  5$:     ASR CHR157
  2726  013470  006237  047312                          ASR CA2113
  2727  013474  042737  100000  047310                  BIC #100000,CHR157
  2728  013502  042737  100000  047312                  BIC #100000,CA2113
  2729  013510  005337  002052                          DEC LOOP
  2730  013514  001363                                  BNE 5$
  2731
        013516  104000                                  ERROR                           ;ERROR
                                                                                        ;-----
```

```
      013520  013516                                .-2
2732                                                ;TAG STORE TESTS
2733                                                ;READING CHR<15:07> FOR TAG DATA (TAGD <21:13>)
2734                                                ;DID NOT RESULT IN CORRECT ADDRESS PATTERN
2735                                                ;LOADED FROM CA<21:13>.
2736 013522  047310                    CHR157       ;PRINT CHR<15:07>
2737 013524  047312                    CA2113       ;PRINT ADDRESS PATTERN USED: CA<21:13>
2738 013526  000000                    0            ;PRINT TERMINATE
2739 013530  000401                    BR 9$        ;NEXT PATTERN
2740 013532  022626              7$:   CMP (SP)+,(SP)+  ;RESTORE STACK DUE TO INTERRUPT
2741 013534  006337  172350       9$:   ASL KPAR4    ;NEXT PATTERN;IF PHYSICAL ADDRESS
2742                                                ;10000000 HAS BEEN DONE; FINISHED
2743 013540  103257                    BCC 1$
2744 013542  012737  000006  000004    MOV #6,4     ;RESTORE VECTORS
2745 013550  005037  000006            CLR 6
2746 013554  000240              10$:  NOP          ;END OF TEST
2747
2748
2749
2750
2751 013556  005237  001464    T103:   INC $TESTN   ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 103
                                .SBTTL
2752                            .SBTTL
2753                            .SBTTL  WRITE FLOATING 1 ACROSS 0'S INTO TAG STORE ADDRESS LOCATION 0000
2754                            .SBTTL  FROM CA<21:13> USING RMI REGISTER (G5179)
2755                            ;;;             PROCEDURE:  START AT 16K BOUNDARY (ADDR. 100000) AND CHECK FOR
2756                            ;;;                         AVAILABLE FLOATING ADRESSES UP TO ADDR. 10000000
2757                            ;;;                         WHEREEVER A FLOATING ADDRESS DOES NOT EXIST USE
2758                            ;;;                         THE RMI REGISTER. IF ADDRESS EXISTS DO NOT PERFORM
2759                            ;;;                         THE TEST SINCE THAT LOCATION WOULD HAVE BEEN TESTED
2760                            ;;;                         BY THE PREVIOUS TEST.
2761                            ;;;
2762                            ;;*****************************************************************
2763 013562  000004                    SCPCND       ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                    ;ERROR/LOOP ON TEST
      013564  013574                    40$          ;TEST START LOCATION
      013566  070050                    1$-40$+70000-14  ;LOOP ON ERROR START LOCATION
      013570  000000                    0            ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      013572  070166                    25$-40$+70000-14  ;LOOP ON ERROR END LOCATION
      013574  012737  001015  177746 40$:   MOV #0FF,CCR  ;DISABLE CACHE
      013602  004437  002352            JSR R4,RELCTH  ;LOCATE TEST CODE TO HIGH CACHE SPACE
      013606  014334                    10$+2        ;ADDRESS OF START OF NEXT TEST

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

2764 013610  132737  000200  001501 2$:    BITB #APTSIZE,$ENVM  ;DOES APT SIZE?
2765 013616  001405                    BEQ 11$      ;NO ,GO AUTOSIZE
2766 013620  032737  000200  001504    BIT #200,$USWR  ;DOES  APT INDICATE
2767                                                ;THAT RMI REGISTER IS PRESENT
2768 013626  001006                    BNE 5$       ;YES,USE IT
2769 013630  000555                    BR 4$        ;APT SAYS DO NOT PERFORM TEST
2770
2771 013632  012737  070352  000004 11$:   MOV #3$-2$+70000,4  ;AUTO-SIZE FOR RMI,PREPARE FOR TRAP
```

```
2772 013640  005737  177770                    TST @#177770            ;READ RMI
2773
2774 013644  012737  001000  172350      5$:   MOV #1000,KPAR4          ;SETUP MEM. MNG. PAGE 4 FOR FIRST FLOATING
2775                                            ;ADDRESS 100000
2776 013652  012737  000002  047332            MOV #2,FLTPAT           ;SETUP 1ST FLOATING PATTERN FOR RMI
2777                                            ;REG. CORRESPONDING TO ADDRESS 40000
2778 013660  012737  070100  000004      1$:   MOV #8$-2$+70000,4      ;SETUP FOR NEX MEMORY
2779 013666  012737  000001  177572            MOV #1,SR0              ;ENABLE MEM.MNGMENT.
2780 013674  012737  000020  172516            MOV #20,SR3             ;ENABLE 22 BIT MAPPING
2781
2782 013702  005737  100000                    TST 100000              ;SELECT PAGE 4. READ ADDRESS SPECIFIED
2783                                            ;BY KPAR4.
2784 013706  000512                            BR 9$                   ;NO TRAP.MEMORY LOCATION EXISTS,SO DON'T
2785                                            ;BOTHER TESTING WITH RMI FOR THIS LOCATION
2786 013710  022626                      8$:   CMP (SP)+,(SP)+         ;TRAP HERE WHEN FLOATING ADDRESS
2787                                            ;LOCATION DOES NOT EXIST.USE RMI FOR TESTING
2788 013712  013701  047332                    MOV FLTPAT,R1           ;PREPARE FLTPAT FOR LOADING INTO RMI
2789 013716  005101                            COM R1
2790
2791 013720  110137  177770                    MOVB R1,@#177770        ;LOAD RMI REGISTER
2792 013724  112737  000002  177750            MOVB #HODO,CMR          ;ALLOWS CACHE TAG STORE TO BE WRITTEN
2793                                            ;TO CHR<15:07> DURING THE DESTINATION
2794                                            ;MEMORY ACCESS OF AN INSTRUCTION ONLY
2795 013732  012737  000015  177746            MOV #15,CCR             ;NO UCB TO ENABLE TAG STORE WRITING
2796 013740  052737  000400  177770            BIS #400,@#177770       ;ENABLE RMI
2797 013746  005737  040000                    TST 40000               ;
2798 013752  005737  100000                    TST 100000              ;SELECT PAGE 4 AND READ FLOATING ADDRESS
2799                                            ;SPECIFIED BY KPAR4. RMI WILL RESPOND
2800                                            ;RESULTING IN THE TAG STORE BEING LOADED
2801                                            ;FROM CA<21:13>
2802 013756  005737  100000                    TST 100000              ;WRITE TAG STORE DATA TO CHR<15:07>
2803 013762  013737  177752  047310            MOV CHR,CHR157          ;SAVE CHR DATA
2804 013770  042737  000400  177770            BIC #400,@#177770       ;DISABLE RMI
2805
     013776  000240                     25$:   NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     014000  000240                            NOP                     ;FOR  LOOP ON ERROR

2806 014002  005037  177572                    CLR SR0                 ;DISABLE MEM MNGMENT.
2807 014006  005037  172516                    CLR SR3
2808 014012  012737  001015  177746            MOV #OFF,CCR            ;DISABLE CACHE
2809 014020  105037  177750                    CLRB CMR                ;DISABLE MAINTENANCE
2810 014024  042737  000177  047310            BIC #177,CHR157
2811 014032  023737  172350  047310            CMP KPAR4,CHR157        ;IS THERE ERROR?
2812 014040  001435                            BEQ 9$                  ;PASS
2813 014042  012737  000006  000004            MOV #6,4
2814 014050  005037  000006                    CLR 6
2815 014054  013737  172350  047312            MOV KPAR4,CA2113        ;SAVE PATTERN USED FOR CA<21:13>.
2816 014062  012737  000007  002052            MOV #7,LOOP             ;PREPARE CHR157 AND CA2113 FOR ERROR PRINT
2817 014070  006237  047310              6$:   ASR CHR157
2818 014074  006237  047312                    ASR CA2113
2819 014100  042737  100000  047310            BIC #100000,CHR157
2820 014106  042737  100000  047312            BIC #100000,CA2113
2821 014114  005337  002052                    DEC LOOP
2822 014120  001363                            BNE 6$
2823
     014122  104000                            ERROR                           ;ERROR
                                                                              ;-----
```

```
      014124  014122                                .-2
2824                                                ;TAG STORE TESTS USING RMI REGISTER
2825                                                ;READING CHR<15:07> FOR TAG DATA (TAGD <21:13>)
2826                                                ;DID NOT RESULT IN CORRECT ADDRESS PATTERN
2827                                                ;LOADED FROM CA<21:13>.
2828 014126  047310                                 CHR157                  ;PRINT CHR<15:07>
2829 014130  047312                                 CA2113                  ;PRINT ADDRESS PATTERN USED: CA<21:13>
2830 014132  000000                                 0                       ;PRINT TERMINATE
2831 014134  006337  172350                  9$:    ASL KPAR4               ;NEXT FLOATING ADDRESS
2832 014140  006337  047332                        ASL FLTPAT              ;NEXT ADDRESS FO RMI
2833 014144  103245                                 BCC 1$                  ;CONTINUE TEST. ADDRESS 10000000
2834                                                ;NOT DONE
2835 014146  012737  000006  000004                MOV #6,@#4              ;RESTORE TRAP VECTORES
2836 014154  005037  000006                        CLR @#6
2837 014160  000464                                 BR 10$                  ;END THE TEST
2838
2839 014162  022626                          3$:    CMP (SP)+,(SP)+         ;TRAP TO HERE IF NO RMI
2840 014164  012737  000006  000004          4$:    MOV #6,@#4              ;RESTORE VECTORS
2841 014172  005037  000006                        CLR @#6
2842 014176  005737  001466                        TST $PASS               ;1ST PASS?
2843 014202  001053                                BNE 10$                 ;NO
2844 014204  023737  000042  000046                CMP @#42,@#46           ;IS THIS ACT11 QV OR AUTO ACCEPT
2845 014212  001447                                BEQ 10$                 ;YES,SKIP TYPEOUT
2846 014214  104401  014222                        TYPE    ,65$            ;;TYPE ASCIZ STRING
      014220  000427                                BR      64$             ;;GET OVER THE ASCIZ
                                          ;;65$:    .ASCIZ  <CRLF>/RMI REGISTER (G5179) NOT USED-SKIP HI ORDER/
      014300                              64$:
2847 014300  104401  014306                        TYPE    ,67$            ;;TYPE ASCIZ STRING
      014304  000412                                BR      66$             ;;GET OVER THE ASCIZ
                                          ;;67$:    .ASCIZ  / BIT ADDRESS TEST/<CRLF>
      014332                              66$:
2848
2849 014332  000240                          10$:   NOP                     ;END OF TEST
2850
2851
2852
2853
2854
2855
2856                                        .SBTTL *
2857                                        .SBTTL
2858                                        .SBTTL *            TAG STORE ADDRESS LINE TESTS
2859                                        .SBTTL              ----------------------------
2860                                        .SBTTL
2861                                        .SBTTL *
2862
2863
2864
2865
2866
2867
2868
2869 014334  005237  001464                 T104:              INC $TESTN              ;UPDATE TEST ID
                                            ;;*****************************************************************
                                            .SBTTL
                                            .SBTTL TEST 104
                                            .SBTTL
```

```
                                .SBTTL
                                .SBTTL VERIFY TAG STORE ADDRESS LINES (CA<12:1>)
                                .SBTTL
                                ;;;             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.
                                ;;;
                                ;;*****************************************************************
014340  000004                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
014342  014352                                40$                     ;TEST START LOCATION
014344  070032                                1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
014346  000000                                0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
014350  070072                                25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
014352  012737  001015  177746        40$:    MOV #OFF,CCR            ;DISABLE CACHE
014360  004437  002352                        JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
014364  014546                                10$+2                   ;ADDRESS OF START OF NEXT TEST

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

014366  012737  000002  047332                MOV #2,FLTPAT           ;1ST FLOATING CACHE DATA STORE ADDRESS PATTERN
014374  012702  040000        2$:     MOV #40000,R2           ;
014400  012703  060000                MOV #60000,R3           ;
014404  063702  047332                ADD FLTPAT,R2           ;R2 CONTAINS 40000+FLTPAT
014410  063703  047332                ADD FLTPAT,R3           ;R3 CONTAINS 60000+FLTPAT
014414  012713  177777                MOV #-1,(R3)            ;ALL 1'S TO MAIN MEM. LOCATION
                                                                ;SPECIFIED BY R3
014420  112737  000002  177750        1$:     MOVB #HODO,CMR          ;ALLOWS TAG  STORE BIT  TO BE
                                                                ;WRITTEN TO CHR<15:07> ONLY DURING THE
                                                                ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
014426  012737  000015  177746                MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
014434  005737  040000                        TST 40000
014440  005737  000000                        TST 0                   ;READ UPDATE; WRITE ALL 0'S INTO CACHE
                                                                ;TAG STORE LOCATION 0000.
014444  005712                                TST (R2)
014446  005713                                TST (R3)                ;READ UPDATE;WRITE BIT PATTERN 000000011
                                                                ;INTO TAG STORE LOCATION SPECIFIED
                                                                ;BY R3'S BITS 1 THRU 12: CA<12:1>
014450  005737  060000                        TST 60000               ;LOAD TAG STORE LOCATION 0000 INTO CHR
014454  013701  177752                        MOV CHR,R1              ;SAVE CHR CONTENTS

014460  000240                25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
014462  000240                        NOP                     ;FOR  LOOP ON ERROR

014464  105037  177750                CLRB CMR                ;DISABLE MAINT. MODE
014470  012737  001015  177746        MOV #OFF,CCR            ;DISABLE CACHE
014476  042701  000177                BIC #177,R1             ;INTERESTED IN ONLY BITS 15:07
014502  005701                        TST R1                  ;CHECK FOR ALL 0'S
014504  001411                        BEQ 9$                  ;PASS
014506  013737  047332  047322        MOV FLTPAT,CA121        ;SAVE CA<12:1> USED
014514  006237  047322                ASR CA121               ;PREPARE CA121 FOR TYPEOUT
```

```
2912
     014520  104000                          ERROR                           ;ERROR
                                             ;-----
     014522  014520                          .-2
2913                                         ;TAG STORE ADRESS LINE TESTS
2914                                         ;READING CHR<15:07> FOR CACHE TAG STORE
2915                                         ;DID NOT RESULT IN ALL 0'S
2916 014524  047322                          CA121                           ;PRINT CACHE TAG STORE ADDRESS LOCATION
2917                                         ;USED: CA<12:1>. NOTE THAT THE 1 IN
2918                                         ;THIS PATTERN WILL POINT TO THE ADDRESS
2919                                         ;LINE THAT POSSIBLY CAUSES ERROR.
2920 014526  000000                          0
2921                                         ;;;
2922 014530  006337  047332          9$:     ASL FLTPAT                      ;NEXT PATTERN
2923 014534  022737  020000  047332          CMP #20000,FLTPAT               ;HAS CACHE TAG STORE LOCAT. 4000 BEEN DONE?
2924 014542  001314                          BNE 2$                          ;NO
2925 014544  000240                  10$:    NOP                 ;END OF TEST
2926
2927
2928
2929
2930                                 .SBTTL *
2931                                 .SBTTL
2932                                 .SBTTL *                                DATA STORE TESTS
2933                                 .SBTTL
2934                                 .SBTTL *
2935
2936
2937
2938
2939
2940
2941 014546  005237  001464          T105:   INC $TESTN                      ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 105
                                     .SBTTL
2942                                 ;;*****************************************************************
2943                                 .SBTTL
2944                                 .SBTTL  WRITE ALL 0'S INTO  DATA STORE LOCATION 0000.
2945                                 .SBTTL          READ ALL 0'S FROM CACHE DATA REGISTER.
2946                                 .SBTTL
2947                                 ;;*****************************************************************
2948 014552  000004                          SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                             ;ERROR/LOOP ON TEST
     014554  014564                          40$                             ;TEST START LOCATION
     014556  070004                          1$-40$+70000-14                 ;LOOP ON ERROR START LOCATION
     014560  000000                          0                               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     014562  070042                          25$-40$+70000-14                ;LOOP ON ERROR END LOCATION
     014564  012737  001015  177746  40$:     MOV #OFF,CCR                    ;DISABLE CACHE
     014572  004437  002352                  JSR R4,RELCTH                   ;LOCATE TEST CODE TO HIGH CACHE SPACE
     014576  014700                          10$+2                           ;ADDRESS OF START OF NEXT TEST

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

2949 014600  005037  060000                  CLR 60000                       ;0'S TO MAIN MEMORY LOCATION
```

```
2950 014604  112737  000002  177750          1$:     MOVB #HODO,CMR          ;ALLOWS CACHE DATA STORE BITS TO BE
2951                                                                          ;WRITTEN TO CDR<15:0> ONLY DURING THE
2952                                                                          ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
2953 014612  012737  000015  177746                  MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2954 014620  005737  040000                          TST 40000               ;
2955 014624  005737  060000                          TST 60000               ;WRITE ALL 0'S TO  DATA STORE
2956                                                                          ;LOCATION 0000 FROM MAIN MEMORY
2957                                                                          ;LOC. 60000
2958 014630  005737  060000                          TST 60000               ;WRITE  DATA STORE BITS FROM
2959                                                                          ;LOC. 0000 INTO CDR<15:0>.
2960 014634  013737  177754  047316                  MOV CDR,CDR150          ;SAVE CDR CONTENTS
2961
     014642  000240                      25$:        NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     014644  000240                                  NOP                     ;FOR  LOOP ON ERROR

2962 014646  105037  177750                          CLRB CMR                ;DISABLE MAINTENANCE
2963 014652  012737  001015  177746                  MOV #OFF,CCR            ;DISABLE CACHE
2964 014660  005737  047316                          TST CDR15C              ;CHECK FOR 0
2965 014664  001404                                  BEQ 10$                 ;PASS
2966
     014666  104000                                  ERROR                           ;ERROR
                                                                                      ;-----
     014670  014666                                  .-2
2967                                                                          ; DATA STORE TESTS
2968                                                                          ;READING CDR<15:0> DID NOT RESULT
2969                                                                          ;IN ALL 0'S
2970 014672  047316                                  CDR150                  ;PRINT CDR<15:0> DATA READ.
2971 014674  000000                                  0
2972                                  ;;;
2973 014676  000240                      10$:        NOP             ;END OF TEST
2974
2975
2976 014700  005237  001464              T106:       INC $TESTN              ;UPDATE TEST ID
                                                    ;;*****************************************************************
                                                    .SBTTL
                                                    .SBTTL TEST 106
                                                    .SBTTL
2977                                                ;;*****************************************************************
2978                                                .SBTTL
2979                                                .SBTTL  WRITE ALL 1'S INTO  DATA STORE LOCATION 0000.
2980                                                ;               READ ALL 1'S FROM CACHE DATA REGISTER.
2981                                                .SBTTL
2982                                                ;;*****************************************************************
2983 014704  000004                                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                    ;ERROR/LOOP ON TEST
     014706  014716                                          40$                     ;TEST START LOCATION
     014710  070006                                          1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     014712  000000                                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR . THIS TEST
     014714  070044                                          25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     014716  012737  001015  177746          40$:        MOV #OFF,CCR            ;DISABLE CACHE
     014724  004437  002352                              JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     014730  015036                                      10$+2                   ;ADDRESS OF START OF NEXT TEST

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

2984 014732  012737  177777  060000                          MOV #-1,60000           ;1'S TO MAIN MEMORY LOCATION
```

```
2985 014740  112737  000002  177750          1$:     MOVB #HODO,CMR          ;ALLOWS CACHE DATA STORE BITS TO BE
2986                                                                          ;WRITTEN TO CDR<15:07> ONLY DURING THE
2987                                                                          ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
2988 014746  012737  000015  177746                  MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
2989 014754  005737  040000                          TST 40000               ;
2990 014760  005737  060000                          TST 60000               ;WRITE ALL 1'S TO  DATA STORE
2991                                                                          ;LOCATION 0000 FROM MAIN MEMORY
2992                                                                          ;LOC. 60000
2993 014764  005737  060000                          TST 60000               ;WRITE  DATA STORE BITS FROM
2994                                                                          ;LOC. 0000 INTO CDR<15:07>.
2995 014770  013737  177754  047316                  MOV CDR,CDR150          ;SAVE CDR CONTENTS
2996
     014776  000240                          25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     015000  000240                                  NOP                     ;FOR  LOOP ON ERROR

2997 015002  105037  177750                          CLRB CMR                ;DISABLE MAINTENANCE
2998 015006  012737  001015  177746                  MOV #OFF,CCR            ;DISABLE CACHE
2999 015014  022737  177777  047316                  CMP #-1,CDR150          ;CHECK ALL 1'S
3000 015022  001404                                  BEQ 10$                 ;PASS
3001
     015024  104000                                  ERROR                           ;ERROR
                                                                                      ;-----
     015026  015024                                  .-2
3002                                                                          ; DATA STORE TESTS
3003                                                                          ;READING CDR<15:0> DID NOT RESULT
3004                                                                          ;IN ALL 1'S
3005 015030  047316                                  CDR150                  ;PRINT CDR<15:0> DATA READ.
3006 015032  000000                                  0
3007                                         ;;;
3008 015034  000240                          10$:    NOP             ;END OF TEST
3009
3010
3011 015036  005237  001464                  T107:   INC $TESTN              ;UPDATE TEST ID
                                                     ;;*****************************************************************
                                                     .SBTTL
                                                     .SBTTL TEST 107
                                                     .SBTTL
3012                                                 ;;*****************************************************************
3013                                                 .SBTTL
3014                                                 .SBTTL  WRITE FLOATING 1 PATTERN INTO  DATA STORE LOCATION 0000.
3015                                                 .SBTTL          READ FLOATING 1 PATTERN FROM CACHE DATA REGISTER.
3016                                                 .SBTTL
3017                                                 ;;*****************************************************************
3018 015042  000004                                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                      ;ERROR/LOOP ON TEST
     015044  015054                                          40$                     ;TEST START LOCATION
     015046  070014                                          1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     015050  000000                                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     015052  070052                                          25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     015054  012737  001015  177746          40$:    MOV #OFF,CCR            ;DISABLE CACHE
     015062  004437  002352                          JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     015066  015222                                  10$+2                   ;ADDRESS OF START OF NEXT TEST

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

3019 015070  012737  000001  047332                  MOV #1,FLTPAT           ;1ST FLOATING 1 PATTERN: 000001
```

```
3020 015076  013737  047332  060000          2$:     MOV FLTPAT,60000        ;FLOATING PATTERN TO MAIN MEMORY
3021 015104  112737  000002  177750          1$:     MOVB #HODO,CMR          ;ALLOWS CACHE DATA STORE BITS TO BE
3022                                                                         ;WRITTEN TO CDR<15:07> ONLY DURING THE
3023                                                                         ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
3024 015112  012737  000015  177746                  MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
3025 015120  005737  040000                          TST 40000               ;
3026 015124  005737  060000                          TST 60000               ;WRITE FLOATING 1 PATTERN TO  DATA STORE
3027                                                                         ;LOCATION 0000 FROM MAIN MEMORY
3028                                                                         ;LOC. 60000
3029 015130  005737  060000                          TST 60000               ;WRITE  DATA STORE BITS FROM
3030                                                                         ;LOC. 0000 INTO CDR<15:0>.
3031 015134  013737  177754  047316                  MOV CDR,CDR150          ;SAVE CDR CONTENTS
3032
     015142  000240                      25$:        NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     015144  000240                                  NOP                     ;FOR  LOOP ON ERROR

3033 015146  105037  177750                          CLRB CMR                ;DISABLE MAINTENANCE
3034 015152  012737  001015  177746                  MOV #OFF,CCR            ;DISABLE CACHE
3035 015160  023737  047332  047316                  CMP FLTPAT,CDR150       ;CHECK FOR CORRECT PATTERN
3036 015166  001410                                  BEQ 9$                  ;PASS
3037 015170  013737  047332  047320                  MOV FLTPAT,EXDAT6       ;SAVE FLOATING PATTERN FOR TYPEOUT
3038
     015176  104000                                  ERROR                           ;ERROR
                                                                                     ;-----
     015200  015176                                  .-2
3039                                                                         ; DATA STORE TESTS
3040                                                                         ;READING CDR<15:0> DID NOT RESULT
3041                                                                         ;IN CORRECT FLOATING 1 PATTERN
3042 015202  047320                                  EXDAT6                  ;PRINT FLOATING PATTERN EXPECTED
3043 015204  047316                                  CDR150                  ;PRINT CDR<15:0> DATA READ.
3044 015206  000000                                  0
3045                                     ;;;
3046 015210  006337  047332                  9$:     ASL FLTPAT              ;NEXT PATTERN
3047 015214  103401                                  BCS 10$                 ;IF PATTERN 100000 HAS BEEN DONE;FINISHED
3048 015216  000727                                  BR 2$                   ;IF NOT, NEXT PASS
3049 015220  000240                          10$:    NOP                 ;END OF TEST
3050
3051 015222  005237  001464              T110:       INC $TESTN              ;UPDATE TEST ID
                                                     ;;*****************************************************************
                                                     .SBTTL
                                                     .SBTTL TEST 110
                                                     .SBTTL
3052                                                 ;;*****************************************************************
3053                                                 .SBTTL
3054                                                 .SBTTL  WRITE ALL 0'S INTO ALL LOW CACHE  DATA STORE LOCATIONS (0000 TO 3777).
3055                                                 .SBTTL          READ ALL 0'S EACH CACHE LOCATION FROM CACHE DATA REGISTER.
3056                                                 .SBTTL
3057                                                 ;;*****************************************************************
3058
3059 015226  000004                                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                     ;ERROR/LOOP ON TEST
     015230  015240                                          40$                     ;TEST START LOCATION
     015232  070024                                          1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     015234  000000                                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     015236  070054                                          25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     015240  012737  001015  177746          40$:    MOV #OFF,CCR            ;DISABLE CACHE
     015246  004437  002352                          JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
```

```
                015252  015420                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

 3060 015254  012705  060000            5$:     MOV #60000,R5           ;ADDRESS 60000 INTO R5
 3061 015260  005025                            CLR (R5)+               ;CLEAR MAIN MEMORY LOW CACHE AREA
 3062 015262  020527  070000                    CMP R5,#70000           ;FINISHED?
 3063 015266  001374                            BNE 5$                  ;NO
 3064 015270  012705  060000                    MOV #60000,R5           ;START WITH ADDRESS 60000
 3065 015274  012703  040000                    MOV #40000,R3           ;ADDRESS 40000 INTO R3
 3066 015300  112737  000002  177750    1$:     MOVB #HODO,CMR          ;ALLOWS CACHE DATA STORE BITS TO BE
 3067                                           ;WRITTEN TO CDR<15:0> ONLY DURING THE
 3068                                           ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
 3069 015306  012737  000015  177746            MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
 3070 015314  005713                            TST (R3)                ;
 3071 015316  005715                            TST (R5)                ;WRITE ALL 0'S TO DATA STORE FROM MAIN MEM.
 3072 015320  005715                            TST (R5)                ;WRITE DATA STORE BITS INTO CDR<15:0>
 3073 015322  013737  177754  047316            MOV CDR,CDR150          ;SAVE CDR CONTENTS
 3074
      015330  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      015332  000240                            NOP                     ;FOR  LOOP ON ERROR

 3075 015334  105037  177750                    CLRB CMR                ;DISABLE MAINTENANCE
 3076 015340  012737  001015  177746            MOV #OFF,CCR            ;DISABLE CACHE
 3077 015346  022737  000000  047316            CMP #0,CDR150           ;CHECK ALL 0'S
 3078 015354  001411                            BEQ 9$                  ;PASS
 3079 015356  010537  047302                    MOV R5,CA210+2          ;SAVE ADDRESS USED THIS PASS
 3080 015362  005037  047300                    CLR CA210
 3081
      015366  104000                            ERROR                           ;ERROR
                                                                                ;-----
      015370  015366                            .-2
 3082                                                                   ; DATA STORE TESTS
 3083                                                                   ;READING CDR<15:0> DID NOT RESULT
 3084                                                                   ;IN ALL 0'S
 3085 015372  047300                            CA210                   ;PRINT CA<21:0> USED
 3086 015374  047316                            CDR150                  ;PRINT CDR<15:0> DATA READ.
 3087 015376  000000                            0
 3088                                   ;;;
 3089 015400  062705  000002            9$:     ADD #2,R5               ;NEXT CACHE LOCATION
 3090 015404  062703  000002                    ADD #2,R3
 3091 015410  022705  070000                    CMP #70000,R5           ;HAVE ALL LOW CACHE LOCATIONS BEEN DONE?
 3092 015414  001331                            BNE 1$                  ;NO
 3093 015416  000240                    10$:    NOP             ;END OF TEST
 3094
 3095 015420  005237  001464            T111:   INC $TESTN              ;UPDATE TEST ID
                                                ;;**************************************************************
                                                .SBTTL
                                                .SBTTL TEST 111
                                                .SBTTL
 3096                                           ;;**************************************************************
 3097                                           .SBTTL
 3098                                           .SBTTL  WRITE ALL 1'S INTO ALL LOW CACHE  DATA STORE LOCATIONS (0000 TO 3777).
 3099                                           .SBTTL          READ ALL 1'S EACH CACHE LOCATION FROM CACHE DATA REGISTER.
 3100                                           .SBTTL
 3101                                           ;;**************************************************************
```

```
3102 015424  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     015426  015436                          40$                     ;TEST START LOCATION
     015430  070026                          1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     015432  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     015434  070056                          25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     015436  012737  001015  177746  40$:    MOV #OFF,CCR            ;DISABLE CACHE
     015444  004437  002352                  JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     015450  015620                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

3103 015452  012705  060000                  MOV #60000,R5           ;ADDRESS 60000 INTO R5
3104 015456  012725  177777          5$:     MOV #-1,(R5)+           ;1'S TO MAIN MEMORY LOW CACHE AREA
3105 015462  020527  070000                  CMP R5,#70000           ;FINISHED?
3106 015466  001373                          BNE 5$                  ;NO
3107 015470  012705  060000                  MOV #60000,R5           ;START WITH ADDRESS 60000
3108 015474  012703  040000                  MOV #40000,R3           ;ADDRESS 40000 INTO R3
3109 015500  112737  000002  177750  1$:     MOVB #HODO,CMR          ;ALLOWS CACHE DATA STORE BITS TO BE
3110                                                                 ;WRITTEN TO CDR<15:0> ONLY DURING THE
3111                                                                 ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
3112 015506  012737  000015  177746          MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
3113 015514  005713                          TST (R3)                ;
3114 015516  005715                          TST (R5)                ;WRITE ALL 1'S TO DATA STORE FROM MAIN MEM.
3115 015520  005715                          TST (R5)                ;WRITE DATA STORE BITS INTO CDR<15:0>
3116 015522  013737  177754  047316          MOV CDR,CDR150          ;SAVE CDR CONTENTS
3117
     015530  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     015532  000240                          NOP                     ;FOR  LOOP ON ERROR

3118 015534  105037  177750                  CLRB CMR                ;DISABLE MAINTENANCE
3119 015540  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
3120 015546  022737  177777  047316          CMP #-1,CDR150          ;CHECK ALL 1'S
3121 015554  001411                          BEQ 9$                  ;PASS
3122 015556  010537  047302                  MOV R5,CA210+2          ;SAVE ADDRESS USED THIS PASS
3123 015562  005037  047300                  CLR CA210
3124
     015566  104000                          ERROR                           ;ERROR
                                                                             ;-----
     015570  015566                          .-2
3125                                                                 ; DATA STORE TESTS
3126                                                                 ;READING CDR<15:0> DID NOT RESULT
3127                                                                 ;IN ALL 1'S
3128 015572  047300                          CA210                   ;PRINT CA<21:0> USED
3129 015574  047316                          CDR150                  ;PRINT CDR<15:0> DATA READ.
3130 015576  000000                          0
3131                                ;;;
3132 015600  062705  000002          9$:     ADD #2,R5               ;NEXT CACHE LOCATION
3133 015604  062703  000002                  ADD #2,R3
3134 015610  022705  070000                  CMP #70000,R5           ;HAVE ALL LOW CACHE LOCATIONS BEEN DONE?
3135 015614  001331                          BNE 1$                  ;NO
3136 015616  000240                  10$:    NOP             ;END OF TEST
3137
3138
3139 015620  005237  001464          T112:   INC $TESTN              ;UPDATE TEST ID
                                    ;;*****************************************************************
```

```
                                .SBTTL
                                .SBTTL TEST 112
                                .SBTTL
3140                            ;;*****************************************************************
3141                            .SBTTL
3142                            .SBTTL  WRITE ALL 0'S INTO ALL HIGH CACHE  DATA STORE LOCATIONS (4000 TO 7777).
3143                            .SBTTL          READ ALL 0'S EACH CACHE LOCATION FROM CACHE DATA REGISTER.
3144                            .SBTTL
3145                            ;;*****************************************************************
3146
3147 015624  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      015626  015636                            40$                     ;TEST START LOCATION
      015630  060024                            1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
      015632  000000                            0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      015634  060054                            25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
      015636  012737  001015  177746      40$:  MOV #OFF,CCR            ;DISABLE CACHE
      015644  004437  002324                    JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
      015650  016016                            10$+2                   ;ADDRESS OF START OF NEXT TEST

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

3148 015652  012705  070000                    MOV #70000,R5           ;ADDRESS 70000 INTO R5
3149 015656  005025                      5$:   CLR (R5)+               ;CLEAR MAIN MEMORY HI CACHE AREA
3150 015660  020527  100000                    CMP R5,#100000          ;FINISHED?
3151 015664  001374                            BNE 5$                  ;NO
3152 015666  012705  070000                    MOV #70000,R5           ;START WITH ADDRESS 70000
3153 015672  012703  050000                    MOV #50000,R3           ;ADDRESS 50000 INTO R3
3154 015676  112737  000002  177750      1$:   MOVB #HODO,CMR          ;ALLOWS CACHE DATA STORE BITS TO BE
3155                                                                    ;WRITTEN TO CDR<15:0> ONLY DURING THE
3156                                                                    ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
3157 015704  012737  000015  177746            MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
3158 015712  005713                            TST (R3)                ;
3159 015714  005715                            TST (R5)                ;WRITE ALL 0'S TO DATA STORE FROM MAIN MEM.
3160 015716  005715                            TST (R5)                ;WRITE DATA STORE BITS INTO CDR<15:0>
3161 015720  013737  177754  047316            MOV CDR,CDR150          ;SAVE CDR CONTENTS
3162
      015726  000240                      25$:  NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      015730  000240                            NOP                     ;FOR  LOOP ON ERROR

3163 015732  105037  177750                    CLRB CMR                ;DISABLE MAINTENANCE
3164 015736  012737  001015  177746            MOV #OFF,CCR            ;DISABLE CACHE
3165 015744  022737  000000  047316            CMP #0,CDR150           ;CHECK ALL 0'S
3166 015752  001411                            BEQ 9$                  ;PASS
3167 015754  010537  047302                    MOV R5,CA210+2          ;SAVE ADDRESS USED THIS PASS
3168 015760  005037  047300                    CLR CA210
3169
      015764  104000                            ERROR                           ;ERROR
                                                                                ;-----
      015766  015764                            .-2
3170                                                                    ; DATA STORE TESTS
3171                                                                    ;READING CDR<15:0> DID NOT RESULT
3172                                  ;;;
3173                                                                    ;IN ALL 0'S
3174 015770  047300                            CA210                   ;PRINT CA<21:0> USED
3175 015772  047316                            CDR150                  ;PRINT CDR<15:0> DATA READ.
```

```
3176 015774  000000                          0
3177                                 ;;;
3178 015776  062705  000002          9$:     ADD #2,R5                ;NEXT CACHE LOCATION
3179 016002  062703  000002                  ADD #2,R3
3180 016006  022705  100000                  CMP #100000,R5           ;HAVE ALL HIGH CACHE LOCATIONS BEEN DONE?
3181 016012  001331                          BNE 1$                   ;NO
3182 016014  000240          10$:            NOP                 ..;END OF TEST
3183
3184
3185 016016  005237  001464          T113:   INC $TESTN               ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 113
                                     .SBTTL
3186                                 ;;*****************************************************************
3187                                 .SBTTL
3188                                 .SBTTL  WRITE ALL 1'S INTO ALL HIGH CACHE  DATA STORE LOCATIONS (4000 TO 7777).
3189                                 .SBTTL          READ ALL 1'S EACH CACHE LOCATION FROM CACHE DATA REGISTER.
3190                                 .SBTTL
3191                                 ;;*****************************************************************
3192 016022  000004                          SCPCND                   ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                      ;ERROR/LOOP ON TEST
      016024  016034                          40$                      ;TEST START LOCATION
      016026  060026                          1$-40$+60000-14          ;LOOP ON ERROR START LOCATION
      016030  000000                          0                        ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      016032  060056                          25$-40$+60000-14         ;LOOP ON ERROR END LOCATION
      016034  012737  001015  177746  40$:     MOV #OFF,CCR             ;DISABLE CACHE
      016042  004437  002324                  JSR R4,RELCTL            ;LOCATE TEST CODE TO LOW CACHE SPACE
      016046  016216                          10$+2                    ;ADDRESS OF START OF NEXT TEST

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

3193 016050  012705  070000                  MOV #70000,R5            ;ADDRESS 70000 INTO R5
3194 016054  012725  177777          5$:     MOV #-1,(R5)+            ;1'S TO MAIN MEMORY HI CACHE AREA
3195 016060  020527  100000                  CMP R5,#100000           ;FINISHED?
3196 016064  001373                          BNE 5$                   ;NO
3197 016066  012705  070000                  MOV #70000,R5            ;START WITH ADDRESS 70000
3198 016072  012703  050000                  MOV #50000,R3            ;ADDRESS 50000 INTO R3
3199 016076  112737  000002  177750  1$:     MOVB #HODO,CMR           ;ALLOWS CACHE DATA STORE BITS TO BE
3200                                                                  ;WRITTEN TO CDR<15:0> ONLY DURING THE
3201                                                                  ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
3202 016104  012737  000015  177746          MOV #15,CCR              ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
3203 016112  005713                          TST (R3)                 ;
3204 016114  005715                          TST (R5)                 ;WRITE ALL 1'S TO DATA STORE FROM MAIN MEM.
3205 016116  005715                          TST (R5)                 ;WRITE DATA STORE BITS INTO CDR<15:0>
3206 016120  013737  177754  047316          MOV CDR,CDR150           ;SAVE CDR CONTENTS
3207
      016126  000240          25$:    NOP                              ;INSTRUCTION 'JMP 1$' PLACED HERE
      016130  000240                  NOP                              ;FOR  LOOP ON ERROR

3208 016132  105037  177750                  CLRB CMR                 ;DISABLE MAINTENANCE
3209 016136  012737  001015  177746          MOV #OFF,CCR             ;DISABLE CACHE
3210 016144  022737  177777  047316          CMP #-1,CDR150           ;CHECK ALL 1'S
3211 016152  001411                          BEQ 9$                   ;PASS
3212 016154  010537  047302                  MOV R5,CA210+2           ;SAVE ADDRESS USED THIS PASS
3213 016160  005037  047300                  CLR CA210
```

```
3214
        016164  104000                  ERROR                   ;ERROR
                                                                ;-----
        016166  016164                  .-2
```

```
3216                                                    ; DATA STORE TESTS
3217                                                    ;READING CDR<15:0> DID NOT RESULT
3218                                                    ;IN ALL 1'S
3219 016170  047300                     CA210          ;PRINT CA<21:0> USED
3220 016172  047316                     CDR150         ;PRINT CDR<15:0> DATA READ.
3221 016174  000000                     0
3222                            ;;;
3223 016176  062705  000002        9$:  ADD #2,R5       ;NEXT CACHE LOCATION
3224 016202  062703  000002             ADD #2,R3
3225 016206  022705  100000             CMP #100000,R5 ;HAVE ALL LOW CACHE LOCATIONS BEEN DONE?
3226 016212  001331                     BNE 1$         ;NO
3227 016214  000240                10$: NOP            ;END OF TEST
3228
3229
3230 016216  005237  001464        T114: INC $TESTN    ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 114
                                .SBTTL
3231
3232
3233                            ;;*****************************************************************
3234                            .SBTTL
3235                            .SBTTL VERIFY CACHE DATA STORE ADDRESS LINES (CA<12:1>)
3236                            .SBTTL
3237                            .SBTTL
3238                            .SBTTL
3239                            .SBTTL
3240                            ;;*****************************************************************
3241 016222  000004                     SCPCND         ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                        ;ERROR/LOOP ON TEST
      016224  016234                     40$            ;TEST START LOCATION
      016226  070040                     1$-40$+70000-14 ;LOOP ON ERROR START LOCATION
      016230  000000                     0              ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      016232  070100                     25$-40$+70000-14 ;LOOP ON ERROR END LOCATION
      016234  012737  001015  177746 40$: MOV #OFF,CCR   ;DISABLE CACHE
      016242  004437  002352             JSR R4,RELCTH  ;LOCATE TEST CODE TO HIGH CACHE SPACE
      016246  016440                     10$+2          ;ADDRESS OF START OF NEXT TEST

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

3242 016250  000240                     NOP
3243                                                    ;WHEN THE TEST IS RELOCATED.ADDRESS 70000
3244                                                    ;WILL BE LOADED WITH ALL 1'S DURING TEST
3245 016252  005037  060000             CLR 60000      ;ALL 0'S TO MAIN MEMORY
3246 016256  012737  000002  047332     MOV #2,FLTPAT  ;1ST FLOATING CACHE DATA STORE ADDRESS PATTERN
3247 016264  012702  040000        2$:  MOV #40000,R2  ;
3248 016270  012703  060000             MOV #60000,R3  ;
3249 016274  063702  047332             ADD FLTPAT,R2  ;R2 CONTAINS 40000+FLTPAT
3250 016300  063703  047332             ADD FLTPAT,R3  ;R3 CONTAINS 60000+FLTPAT
3251 016304  012713  177777             MOV #-1,(R3)   ;ALL 1'S TO MAIN MEM. LOCATION
3252                                                    ;SPECIFIED BY R3
3253 016310  112737  000002  177750 1$:  MOVB #HODO,CMR ;ALLOWS CACHE DATA STORE BITS TO BE
3254                                                    ;WRITTEN TO CDR<15:0> ONLY DURING THE
3255                                                    ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
3256 016316  012737  000015  177746     MOV #15,CCR    ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
```

```
3257 016324  005737  040000                    TST 40000
3258 016330  005737  060000                    TST 60000              ;WRITE ALL 0'S FROM MAIN MEM. LOCATION
3259                                                                  ;60000 INTO CACHE DATA STORE LOCATION 0000.
3260 016334  005712                            TST (R2)
3261 016336  005713                            TST (R3)               ;WRITE ALL 1'S FROM MAIN MEM. INTO
3262                                                                  ;CACHE DATA STORE LOCAT. SPECIFIED
3263                                                                  ;BY R3'S BITS 1 THRU 12: CA<12:1>
3264 016340  005737  060000                    TST 60000              ;LOAD DATA FROM CACHE DATA STORE LOCATION
3265                                                                  ;0000 INTO CDR.
3266 016344  013701  177754                    MOV CDR,R1             ;SAVE CDR DATA
3267
     016350  000240                    25$:    NOP                    ;INSTRUCTION 'JMP 1$' PLACED HERE
     016352  000240                            NOP                    ;FOR  LOOP ON ERROR

3268 016354  105037  177750                    CLRB CMR               ;DISABLE MAINT. MODE
3269 016360  012737  001015  177746            MOV #OFF,CCR           ;DISABLE CACHE
3270 016366  005701                            TST R1                 ;CHECK FOR ALL 0'S
3271 016370  001411                            BEQ 9$                 ;PASS
3272
3273 016372  013737  047332  047322            MOV FLTPAT,CA121       ;SAVE CA<12:1> USED
3274 016400  006237  047322                    ASR CA121              ;PREPARE CA121 FOR TYPEOUT
3275
     016404  104000                            ERROR                          ;ERROR
                                                                              ;-----
     016406  016404                            .-2
3276                                                                  ;DATA STORE TESTS- ADDRESS LINE VERIFICATION
3277                                                                  ;READING CDR<15:0> FOR CACHE DATA STORE
3278                                                                  ;DID NOT RESULT IN ALL 0'S
3279 016410  047322                            CA121                  ;PRINT CACHE DATA STORE ADDRESS LOCATION
3280                                                                  ;USED: CA<12:1>. NOTE THAT THE 1 IN
3281                                                                  ;THIS PATTERN WILL POINT TO THE ADDRESS
3282                                                                  ;LINE THAT POSSIBLY CAUSES ERROR.
3283 016412  000000                            0
3284                                                                  ;;;
3285 016414  006337  047332                9$:     ASL FLTPAT             ;NEXT PATTERN
3286 016420  022737  020000  047332                CMP #20000,FLTPAT      ;HAS CACHE DATA STORE LOCAT. 4000 BEEN DONE?
3287 016426  001316                            BNE 2$                 ;NO
3288 016430  012737  000240  070000            MOV #240,70000         ;RESTORE OVERWRITTEN LOCATION 7000
3289                                                                  ;WITH A NOP
3290 016436  000240                    10$:    NOP             ;END OF TEST
3291
3292
3293
3294
3295
3296                                .SBTTL *
3297                                .SBTTL
3298                                .SBTTL *              COMPARE TAG STORE DATA WITH CACHE ADDRESS LINE DATA TESTS
3299                                .SBTTL
3300                                .SBTTL *
3301
3302
3303
3304
3305
3306 016440  005237  001464        T115:           INC $TESTN             ;UPDATE TEST ID
                                    ;;*****************************************************************
```

```
                                .SBTTL
                                .SBTTL TEST 115
                                .SBTTL
3307                            ;;*****************************************************************
3308                            .SBTTL
3309                            .SBTTL VERIFY THAT AN EQUAL DATA COMPARISON CONDITION CAN EXIST
3310                            .SBTTL     BY COMPARING TAG STORE DATA AND CA<21:13>
3311                            .SBTTL
3312                            .SBTTL UNDER THE FOLLOWING CONDITIONS CMR<15:13> SHOULD RESULT IN ALL
3313                            .SBTTL       1'S INDICATING A MATCH :
3314                            .SBTTL
3315                            .SBTTL                  TAG STORE DATA AND CA<21:13> ALL 0'S
3316                            .SBTTL
3317                            ;;*****************************************************************
3318 016444  000004                       SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
      016446  016456                       40$                     ;TEST START LOCATION
      016450  070000                       1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
      016452  000000                       0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      016454  070036                       25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
      016456  012737  001015  177746  40$: MOV #OFF,CCR             ;DISABLE CACHE
      016464  004437  002352               JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
      016470  016634                       10$+2                   ;ADDRESS OF START OF NEXT TEST

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

3319 016472  112737  000002  177750  1$:  MOVB #HODO,CMR           ;ALLOWS COMPARED RESULTS TO BE
3320                                                                ;WRITTEN TO CMR<15:13> ONLY DURING
3321                                                                ;THE DESTINATION MEMORY ACCESS
3322                                                                ;OF AN INSTRUCTION
3323 016500  012737  000015  177746       MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
3324 016506  005737  040000               TST 40000
3325 016512  005737  000000               TST 0                   ;WRITE ALL 0'S INTO TAG STORE LOCATION 0000
3326                                                                ;FROM CACHE ADDRESS CA<21:13>
3327 016516  005737  000000               TST 0                   ;PLACE ALL 0'S ON CA<21:13> FOR COMPARISON
3328                                                                ;WITH TAG STORE DATA. WRITE COMPARED
3329                                                                ;RESULTS INDICATION IN CMR<15:13>
3330 016522  013737  177750  047326       MOV CMR,CM1513          ;SAVE CMR DATA
3331
      016530  000240                25$:  NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      016532  000240                       NOP                     ;FOR  LOOP ON ERROR

3332 016534  105037  177750               CLRB CMR                        ;DISABLE MAINTENANCE MODE
3333 016540  012737  001015  177746       MOV #OFF,CCR            ;DISABLE CACHE
3334 016546  042737  017777  047326       BIC #17777,CM1513
3335 016554  022737  160000  047326       CMP #160000,CM1513      ;CHECK THAT CMR<15:13> ALL 1'S
3336 016562  001423                       BEQ 10$                 ;PASS
3337
3338
3339 016564  012737  000007  047324       MOV #7,EXDAT1           ;INDICATE EXPECTED CMR<15:13>
3340 016572  012737  000015  002052       MOV #13.,LOOP           ;ERROR;PREPARE CM1513. FOR TYPEOUT
3341 016600  006237  047326           2$:  ASR CM1513
3342 016604  042737  100000  047326       BIC #100000,CM1513
3343 016612  005337  002052               DEC LOOP
3344 016616  001370                       BNE 2$
3345
```

```
016620  104000                          ERROR                           ;ERROR
                                                                        ;-----
016622  016620                          .-2
3346                                                    ;COMPARE TAG STORE & CA<21:13> TESTS
3347                                                    ;BITS 15 THRU 13 OF CMR DID NOT READ
3348                                                    ;AS ALL 1'S
3349 016624  047324                    EXDAT1          ;PRINT CMR<15:13> DATA EXPECTED
3350 016626  047326                    CM1513          ;PRINT CMR<15:13> DATA RECEIVED
3351 016630  000000                    0
3352 016632  000240              10$:  NOP             ;END OF TEST
3353
3354
3355
3356
3357 016634  005237  001464      T116: INC $TESTN              ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 116
                                .SBTTL
3358                            ;;*****************************************************************
3359                            .SBTTL
3360                            .SBTTL VERIFY THAT AN UNEQUAL DATA COMPARISON CONDITION CAN BE DETECTED
3361                            .SBTTL     BY COMPARING TAG STORE AND CA<21:13>
3362                            .SBTTL
3363                            ;;; UNDER THE FOLLOWING CONDITIONS FOR TAG STORE DATA AND CA<21:13>
3364                            ;;;          CMR<15:13> SHOULD READ AS SPECIFIED:
3365
3366 016640  000137  016666      JMP 38$+2
3367                            ;;;     CMR<15:13>      CA<21:13>       TAG STORE
3368                            ;;;     ----------      ---------       ---------
3369 016644  000006              30$:       6            ;  001            000
3370 016646  000005              31$:       5            ;  002            000
3371 016650  000005              32$:       5            ;  004            000
3372 016652  000005              33$:       5            ;  010            000
3373 016654  000005              34$:       5            ;   020           000
3374 016656  000003              35$:       3            ;  040            000
3375 016660  000003              36$:       3            ; 100             000
3376 016662  000003              37$:       3            ;  200            000
3377 016664  000003              38$:       3            ;  400            000
3378                            .SBTTL
3379                            .SBTTL
3380                            ;;*****************************************************************
3381 016666  000004                      SCPCND                    ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                   ;ERROR/LOOP ON TEST
     016670  016700                      40$                       ;TEST START LOCATION
     016672  070012                      1$-40$+70000-14           ;LOOP ON ERROR START LOCATION
     016674  000000                      0                         ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     016676  070104                      25$-40$+70000-14          ;LOOP ON ERROR END LOCATION
     016700  012737  001015  177746  40$: MOV #OFF,CCR              ;DISABLE CACHE
     016706  004437  002352              JSR R4,RELCTH             ;LOCATE TEST CODE TO HIGH CACHE SPACE
     016712  017230                      10$+2                     ;ADDRESS OF START OF NEXT TEST

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

3382 016714  012737  000200  172350  2$:  MOV #200,KPAR4           ;KPAR4 CONTAINS THE FLOATING 1 PATTERN
3383                                                               ;AND REPRESENTS THE THE PAGE ADDRESS FIELD
```

```
3384                                                    ;DATA USED BY MEMORY MNGMNT. TO CONSTRUCT
3385                                                    ;THE PHYSICAL ADDRESS.  200 IS THE 1ST
3386                                                    ;FLOATING 1 PATTERN WHICH WILL BE CONSTRUCTED
3387                                                    ;TO ADDRESS 20000.
3388 016722  012701  016644                MOV #30$,R1     ;SAVE ADDRESS OF FIRST CMR<15:13>
3389                                                    ;EXPECTED DATA
3390 016726  012737  070254  000004   1$:  MOV #7$-2$+70000,4       ;ALLOW FOR NEX TRAP
3391 016734  012737  000340  000006       MOV #340,6
3392 016742  112737  000002  177750       MOVB #HODO,CMR  ;ALLOWS COMPARED RESULTS TO BE WRITTEN
3393                                                    ;TO CMR<15:13> ONLY DURING THE DESTINATION
3394                                                    ;MEMORY ACCESS OF AN INSTRUCTION.
3395 016750  012737  000015  177746       MOV #15,CCR     ;NO UCB SO AS TO WRITE CACHE STORE
3396 016756  012737  000001  177572       MOV #1,SR0      ;ENABLE MEMORY MNGMNT.
3397 016764  012737  000020  172516       MOV #20,SR3     ;ENABLE 22-BIT MAPPING
3398 016772  005737  040000               TST 40000       ;
3399 016776  005737  000000               TST 0           ;WRITE ALL 0'S TO TAG STORE LOCATION 0000
3400 017002  005737  100000               TST 100000      ;CHOOSES KPAR4 FOR ADDRESSING. PHYSICAL
3401                                                    ;ADDRESS WILL BE DETERMINED BY FLOATING
3402                                                    ;PATTERN USED IN KPAR4.
3403                                                    ;PLACE DLOATING PATTERN ON CA<21:13>
3404                                                    ;FOR COMPARISON WITH TAG STORE DATA
3405                                                    ;AT LOCATION 0000. WRITE THE COMPARED
3406                                                    ;RESULT INDICATION INTO CMR<15:13>.
3407 017006  000240                        NOP
3408 017010  000240                        NOP
3409 017012  013737  177750  047326       MOV CMR,CM1513  ;SAVE CMR DATA
3410
     017020  000240               25$:    NOP             ;INSTRUCTION 'JMP 1$' PLACED HERE
     017022  000240                       NOP             ;FOR  LOOP ON ERROR

3411 017024  005037  177572               CLR SR0         ;DISABLE MEM MNGMENT.
3412 017030  005037  172516               CLR SR3
3413 017034  012737  001015  177746       MOV #OFF,CCR    ;DISABLE CACHE
3414 017042  105037  177750               CLRB CMR        ;DISABLE MAINTENANCE
3415 017046  012737  000015  002052       MOV #13.,LOOP   ;PREPARE CM1513.  FOR ERROR CHECK
3416 017054  006237  047326           5$: ASR CM1513
3417 017060  042737  100000  047326       BIC #100000,CM1513
3418 017066  005337  002052               DEC LOOP
3419 017072  001370                       BNE 5$
3420 017074  023711  047326               CMP CM1513,(R1) ;COMPARE CMR<15:13> RECEIVED WITH
3421                                                    ;EXPECTED
3422 017100  001426                       BEQ 9$          ;PASS
3423 017102  013737  172350  047312       MOV KPAR4,CA2113        ;SAVE PATTERN USED FOR CA<21:13>
3424 017110  012737  000007  002052       MOV #7,LOOP     ;PREPARE CA2113 FOR PRINTOUT
3425 017116  006237  047312           6$: ASR CA2113
3426 017122  042737  100000  047312       BIC #100000,CA2113
3427 017130  005337  002052               DEC LOOP
3428 017134  001370                       BNE 6$
3429 017136  011137  047324               MOV (R1),EXDAT1 ;PREPARE EXPECTED FOR PRINTOUT
3430
     017142  104000               9$:     ERROR                   ;ERROR
                                                                    ;-----
     017144  017142                       .-2
3431                                                    ;COMPARE TAG STORE AND CA<21:13> TESTS
3432                                                    ;CMR<15:13> DID NOT READ CORRECTLY
3433 017146  047312               EXDAT1: CA2113          ;PRINT CA<21:13> PATTERN USED ON ADDRESS
3434                                                    ;LINES
```

```
3435 017150  047324                          EXDAT1                  ;PRINT CMR<15:13> EXPECTED
3436 017152  047326                          CM1513                  ;PRINT CMR<15:13> RECEIVED
3437 017154  000000                          0                       ;PRINT TERMINATE
3438 017156  006337  172350          9$:     ASL KPAR4               ;NEXT PATTERN;IF PHYSICAL ADDRESS
3439                                                                 ;10000000 HAS BEEN DONE; FINISHED
3440 017162  103414                          BCS 8$                  ;
3441 017164  005721                          TST (R1)+               ;NOT FINISHED; POINT TO NEXT
3442                                                                 ;CMR<15:13> EXPECTED
3443 017166  000657                          BR 1$                   ;CONTINUE WITH TEST
3444 017170  005037  177572          7$:     CLR SR0                 ;DISABLE MEM. MNGMNT.
3445 017174  005037  172516                  CLR SR3
3446 017200  105037  177750                  CLRB CMR                        ;DISABLE MAINTENANCE
3447 017204  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
3448 017212  022626                          CMP (SP)+,(SP)+         ;RESTORE STACK DUE TO INTERRUPT
3449 017214  012737  000006  000004  8$:     MOV #6,4                ;RESTORE VECTORS
3450 017222  005037  000006                  CLR 6                   ;
3451 017226  000240                  10$:    NOP             ;END OF TEST
3452
3453
3454
3455
3456                                 .SBTTL *
3457                                 .SBTTL
3458                                 .SBTTL *                FLUSH CACHE TESTS
3459                                 .SBTTL
3460                                 .SBTTL *
3461
3462
3463
3464
;3465 017230  005237  001464          T117:           INC $TESTN              ;UPDATE TEST ID
                                     ;;*********************************************************************
                                     .SBTTL
                                     .SBTTL TEST 117
                                     .SBTTL
3466                                 .SBTTL
3467                                 .SBTTL  VERIFY FLUSH IN PROGRESS BIT WILL SET AS A RESULT OF FLUSH
3468                                 .SBTTL
3469                                 ;;*********************************************************************
3470 017234  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
      017236  017246                         40$                     ;TEST START LOCATION
      017240  017246                         1$                      ;LOOP ON ERROR START LOCATION
      017242  000000                         0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      017244  017302                         25$                     ;LOOP ON ERROR END LOCATION
      017246                         40$:
3471 017246  005002                  1$:     CLR R2                  ;INITIALIZE COUNTER
3472 017250  005037  002060                  CLR  FAIL1              ;INITIALIZE ERROR FLAG
3473 017254  052737  000400  177746          BIS #FC,CCR             ;FLUSH CACHE
3474 017262  032737  010000  177746          BIT #VCIP,CCR           ;VERIFY FLUSH IN PROGRESS
3475 017270  001002                          BNE 3$                  ;VCIP BIT IS SET
3476 017272  005237  002060                  INC FAIL1               ;INDICATE ERROR
3477 017276  005302                  3$:     DEC R2                  ;WAIT DELAY FOR FLUSH TO COMPLETE
3478 017300  001376                          BNE .-2
3479
      017302  000240                 25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      017304  000240                         NOP                     ;FOR  LOOP ON ERROR
```

```
3480 017306  005737  002060                    TST FAIL1               ;IS THERE ERROR
3481 017312  001403                            BEQ 10$                 ;PASS
3482
     017314  104000                            ERROR                           ;ERROR
                                                                                ;-----
     017316  017314                            .-2
3483                                                                    ;FLUSH CACHE TESTS
3484                                                                    ;FLUSH IN PROGRESS BIT(VCIP) FAILED
3485                                                                    ;TO SET AS A RESULT OF SETTING CACHE FLUSH BIT
3486 017320  000000                            0
3487 017322  000240                    10$:    NOP             ;END OF TEST
3488
3489
3490
3491
3492 017324  005237  001464           T120:   INC $TESTN              ;UPDATE TEST ID
                                      ;;*****************************************************************
                                      .SBTTL
                                      .SBTTL TEST 120
                                      .SBTTL
3493                                  .SBTTL
3494                                  .SBTTL  VERIFY FLUSH IN PROGRESS BIT(VCIP) WILL RESET ON COMPLETION OF FLUSH
3495                                  .SBTTL
3496                                  ;;*****************************************************************
3497 017330  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     017332  017342                            40$                     ;TEST START LOCATION
     017334  017342                            1$                      ;LOOP ON ERROR START LOCATION
     017336  000000                            0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     017340  017366                            25$                     ;LOOP ON ERROR END LOCATION
     017342                            40$:
3498 017342  005002                    1$:     CLR R2                  ;INITIALIZE COUNTER
3499 017344  052737  000400  177746            BIS #FC,CCR             ;START FLUSH
3500 017352  032737  010000  177746    3$:     BIT #VCIP,CCR           ;SEE IF FLUSH COMPLETE
3501 017360  001407                            BEQ 10$                 ;FLUSH COMPLETE
3502 017362  005302                            DEC R2                  ;SEE IF TIME HAS RUN OUT
3503 017364  001372                            BNE 3$                  ;NOT YET
3504
     017366  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     017370  000240                            NOP                     ;FOR  LOOP ON ERROR

3505
     017372  104000                            ERROR                           ;ERROR
                                                                                ;-----
     017374  017372                            .-2
3506                                                                    ;FLUSH CACHE TESTS
3507                                                                    ;FLUS IN PROGRESS BIT FAILED TO CLEAR
3508                                                                    ;TIME FOR FLUSH TO COMPLETE RAN OUT
3509 017376  000000                            0
3510 017400  000240                    10$:    NOP             ;END OF TEST
3511
3512
3513
3514
3515 017402  005237  001464           T121:   INC $TESTN              ;UPDATE TEST ID
                                      ;;*****************************************************************
```

```
                                .SBTTL
                                .SBTTL TEST 121
                                .SBTTL
                                .SBTTL
3516                            .SBTTL  VERIFY THAT VSIU BIT WILL CHANGE FROM A CLEAR TO SET CONDITION AS
3517                            .SBTTL  A RESULT OF CACHE FLUSH
3518                            .SBTTL
3519                            ;;**************************************************************************
3520
3521 017406  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
     017410  017420                        40$                     ;TEST START LOCATION
     017412  017420                        1$                      ;LOOP ON ERROR START LOCATION
     017414  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     017416  017464                        25$                     ;LOOP ON ERROR END LOCATION
     017420                         40$:
3522 017420  032737  020000  177746   1$:     BIT #VSIU,CCR           ;IS SET A BEING USED
3523 017426  001407                        BEQ 3$                  ;YES
3524 017430  052737  000400  177746        BIS #FC,CCR             ;CAUSE FLUSH FOR SET A
3525 017436  032737  010000  177746        BIT #VCIP,CCR           ;WAIT FOR FLUSH TO COMPLETE
3526 017444  001374                        BNE .-6
3527 017446  052737  000400  177746   3$:     BIS #FC,CCR             ;CAUSE FLUSH
3528 017454  032737  010000  177746        BIT #VCIP,CCR           ;WAIT FOR FLUSH TO COMPLETE
3529 017462  001374                        BNE .-6
3530
     017464  000240                   25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     017466  000240                           NOP                     ;FOR  LOOP ON ERROR

3531 017470  032737  020000  177746        BIT #VSIU,CCR           ;IS VSIU BIT =1 INDICATING VALID SET
3532                                                                ;B WAS SELECTED
3533 017476  001003                        BNE 10$                 ;PASS
3534
     017500  104000                        ERROR                           ;ERROR
                                                                            ;-----
     017502  017500                        .-2
3535                                                                ;FLUSH CACHE TESTS
3536                                                                ;VSIU BIT DID NOT SET AS A RESULT OF FLUSH
3537 017504  000000                        0
3538 017506  000240                  10$:  NOP             ;END OF TEST
3539
3540
3541
3542
3543 017510  005237  001464        T122:   INC $TESTN              ;UPDATE TEST ID
                                    ;;**************************************************************************
                                .SBTTL
                                .SBTTL TEST 122
                                .SBTTL
3544                            .SBTTL
3545                            .SBTTL  VERIFY THAT VSIU BIT WILL CHANGE FROM A SET TO CLEAR CONDITION AS
3546                            .SBTTL  A RESULT OF CACHE FLUSH
3547                            .SBTTL
3548                            ;;**************************************************************************
3549 017514  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
     017516  017526                        40$                     ;TEST START LOCATION
     017520  017526                        1$                      ;LOOP ON ERROR START LOCATION
     017522  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
```

```
                017524  017572                          25$                     ;LOOP ON ERROR END LOCATION
                017526                          40$:
3550            017526  032737  020000  177746  1$:     BIT #VSIU,CCR           ;IS SET B BEING USED
3551            017534  001007                          BNE 3$                  ;YES
3552            017536  052737  000400  177746          BIS #FC,CCR             ;CAUSE FLUSH FOR SET B
3553            017544  032737  010000  177746          BIT #VCIP,CCR           ;WAIT FOR FLUSH TO COMPLETE
3554            017552  001374                          BNE .-6
3555            017554  052737  000400  177746  3$:     BIS #FC,CCR             ;CAUSE FLUSH
3556            017562  032737  010000  177746          BIT #VCIP,CCR           ;WAIT FOR FLUSH TO COMPLETE
3557            017570  001374                          BNE .-6
3558
                017572  000240                  .25$:   NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
                017574  000240                          NOP                     ;FOR  LOOP ON ERROR

3559            017576  032737  020000  177746          BIT #VSIU,CCR           ;IS VSIU BIT =0 INDICATING VALID SET
3560                                                                            ;A WAS SELECTED
3561            017604  001403                          BEQ 10$                 ;PASS
3562
                017606  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                017610  017606                          .-2
3563                                                                            ;FLUSH CACHE TESTS
3564                                                                            ;VSIU BIT DID NOT CLEAR AS A RESULT OF FLUSH
3565            017612  000000                          0
3566            017614  000240                  10$:    NOP             ;END OF TEST
3567
3568
3569
3570                                    .SBTTL *
3571                                    .SBTTL
3572                                    .SBTTL *                                VALID BITS STORE TESTS- SET A
3573                                    .SBTTL
3574                                    .SBTTL *
3575
3576
3577
3578            017616  005237  001464  T123:           INC $TESTN              ;UPDATE TEST ID
                                        ;;*****************************************************************
                                        .SBTTL
                                        .SBTTL TEST 123
                                        .SBTTL
3579                                    .SBTTL  WRITE AND READ 0'S TO ALL LOW CACHE  VALID
3580                                    .SBTTL  BIT STORE ADDRESS LOCATIONS- SET A
3581                                    .SBTTL  (VALID STORE LOCATIONS 0000 TO 3777)
3582                                    .SBTTL
3583                                    ;;*****************************************************************
3584            017622  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                ;ERROR/LOOP ON TEST
                017624  017634                          40$                     ;TEST START LOCATION
                017626  070052                          1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
                017630  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
                017632  070100                          25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
                017634  012737  001015  177746  40$:     MOV #OFF,CCR            ;DISABLE CACHE
                017642  004437  002352                  JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
                017646  020034                          10$+2                   ;ADDRESS OF START OF NEXT TEST

                                        ;THE FOLLOWING LOCATIONS INCLUDING 10$
```

```
                                        ;ARE RELOCATED TO HI CACHE SPACE

3585 017650  032737  020000  177746          BIT #VSIU,CCR           ;IS SET A BEING USED?
3586 017656  001407                          BEQ 3$                  ;YES
3587 017660  052737  000400  177746          BIS #FC,CCR             ;NO; FLUSH CACHE FOR SET A
3588 017666  032737  010000  177746          BIT #VCIP,CCR           ;WAIT TILL FLUSH COMPLETE
3589 017674  001374                          BNE .-6
3590 017676  012737  177777  177752    3$:   MOV #-1,CHR             ;LOAD AMR<21:0> WITH 1'S VIA CHR AND CMR
3591                                         ;REGISTERS, SINCE TDAR WILL BE USED
3592 017704  112737  000374  177751          MOVB #374,CMR+1
3593 017712  012705  060000                  MOV #60000,R5           ;;ADDRESS 60000 INTO R5
3594 017716  012703  040000                  MOV #40000,R3           ;ADDRESS 40000 INTO R3
3595 017722  012737  000015  177746    1$:   MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3596 017730  112737  000003  177750          MOVB #HODO+TDAR,CMR     ;HODO ALLOWS VALID STORE  SET A TO
3597                                         ;BE WRITTEN TO CMR<12> ONLY DURING
3598                                         ;THE DESTINATION MEMORY ACCESS.
3599                                         ;TDAR WILL FORCE A 0 TO BE WRITTEN
3600                                         ;INTO VALID STORE WHEN A WRITE TO
3601                                         ;VALID STORE OCCURS
3602 017736  005713                          TST (R3)
3603 017740  005715                          TST (R5)                ;WRITE A 0 INTO VALID STORE ADDRESS
3604                                         ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3605 017742  005715                          TST (R5)                ;WRITE VALID STORE DATA INTO CMR<12>
3606                                         ;FROM VALID STORE ADDRESS LOCATION
3607                                         ;JUST WRITTEN INTO.
3608 017744  013701  177750                  MOV CMR,R1              ;SAVE CMR DATA
3609
     017750  000240                  25$:   NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     017752  000240                          NOP                     ;FOR  LOOP ON ERROR

3610 017754  105037  177750                  CLRB CMR                ;DISABLE MAINT. MODE
3611 017760  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
3612 017766  032701  010000                  BIT #VLD,R1             ;CMR<12> SHOULD BE 0.
3613 017772  001410                          BEQ 9$                  ;PASS
3614
3615 017774  010537  047322                  MOV R5,CA121            ;SAVE VALID STORE ADDRESS LOCATION
3616                                         ;USED: CA<12:1>
3617 020000  006237  047322                  ASR CA121               ;PREPARE CA121 FOR TYPEOUT
3618
     020004  104000                          ERROR                           ;ERROR
                                                                             ;-----
     020006  020004                          .-2
3619                                         ;VALID BITS STORE TESTS
3620                                         ;READING VALID STORE DATA SET A
3621                                         ;THRU CMR<12> DID NOT RESULT IN 0.
3622 020010  047322                          CA121                   ;PRINT VALID STORE ADDRESS LOCATION
3623                                         ;USED: CA<12:1>.
3624 020012  000000                          0
3625                                 ;;;
3626 020014  062705  000002            9$:   ADD #2,R5               ;NEXT VALID STORE LOCATION
3627 020020  062703  000002                  ADD #2,R3
3628 020024  020527  070000                  CMP R5,#70000           ;HAVE ALL LOW CACHE ADDRESS LOCATIONS
3629                                         ;BEEN DONE?
3630 020030  001334                          BNE 1$                  ;NO
3631 020032  000240                    10$:  NOP             ;END OF TEST
3632
3633
```

```
3634 020034  005237  001464          T124:           INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 124
                                     .SBTTL
3635                                 .SBTTL  WRITE AND READ 1'S TO ALL LOW CACHE  VALID
3636                                 .SBTTL  BIT STORE ADDRESS LOCATIONS- SET A
3637                                 .SBTTL  (VALID STORE LOCATIONS 0000 TO 3777)
3638                                 .SBTTL
3639                                 ;;*****************************************************************
3640 020040  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     020042  020052                          40$                     ;TEST START LOCATION
     020044  070036                          1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     020046  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     020050  070064                          25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     020052  012737  001015  177746    40$:  MOV #OFF,CCR            ;DISABLE CACHE
     020060  004437  002352                  JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     020064  020236                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

3641 020066  032737  020000  177746        BIT #VSIU,CCR           ;IS SET A BEING USED?
3642 020074  001407                        BEQ 3$                  ;YES
3643 020076  052737  000400  177746        BIS #FC,CCR             ;NO; FLUSH CACHE FOR SET A
3644 020104  032737  010000  177746        BIT #VCIP,CCR           ;WAIT TILL FLUSH COMPLETE
3645 020112  001374                        BNE .-6
3646 020114  012705  060000          3$:   MOV #60000,R5           ;;ADDRESS 60000 INTO R5
3647 020120  012703  040000                MOV #40000,R3           ;ADDRESS 40000 INTO R3
3648 020124  012737  000015  177746    1$:  MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3649 020132  112737  000002  177750        MOVB #HODO,CMR          ;HODO ALLOWS VALID STORE  SET A TO
3650                                                                 ;BE WRITTEN TO CMR<12> ONLY DURING
3651                                                                 ;THE DESTINATION MEMORY ACCESS.
3652 020140  005713                        TST (R3)
3653 020142  005715                        TST (R5)                ;WRITE A 1 INTO VALID STORE ADDRESS
3654                                                                 ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3655 020144  005715                        TST (R5)                ;WRITE VALID STORE DATA INTO CMR<12>
3656                                                                 ;FROM VALID STORE ADDRESS LOCATION
3657                                                                 ;JUST WRITTEN INTO.
3658 020146  013701  177750                MOV CMR,R1              ;SAVE CMR DATA
3659
     020152  000240                25$:   NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     020154  000240                       NOP                     ;FOR  LOOP ON ERROR

3660 020156  105037  177750                CLRB CMR                ;DISABLE MAINT. MODE
3661 020162  012737  001015  177746        MOV #OFF,CCR            ;DISABLE CACHE
3662 020170  032701  010000                BIT #VLD,R1             ;CMR<12> SHOULD BE 1.
3663 020174  001010                        BNE 9$                  ;PASS
3664
3665 020176  010537  047322                MOV R5,CA121            ;SAVE VALID STORE ADDRESS LOCATION
3666                                                                 ;USED: CA<12:1>
3667 020202  006237  047322                ASR CA121               ;PREPARE CA121 FOR TYPEOUT
3668
     020206  104000                       ERROR                           ;ERROR
                                                                          ;-----
     020210  020206                       .-2
```

```
3669                                                    ;VALID BITS STORE TESTS
3670                                                    ;READING VALID STORE DATA SET A
3671                                                    ;THRU CMR<12> DID NOT RESULT IN 1.
3672 020212  047322                    CA121           ;PRINT VALID STORE ADDRESS LOCATION
3673                                                    ;USED: CA<12:1>.
3674 020214  000000                    0
3675                                ;;;
3676 020216  062705  000002        9$:  ADD #2,R5       ;NEXT VALID STORE LOCATION
3677 020222  062703  000002             ADD #2,R3
3678 020226  020527  070000             CMP R5,#70000   ;HAVE ALL LOW CACHE ADDRESS LOCATIONS
3679                                                    ;BEEN DONE?
3680 020232  001334                     BNE 1$          ;NO
3681 020234  000240                10$: NOP             ;END OF TEST
3682
3683
3684
3685 020236  005237  001464        T125: INC $TESTN     ;UPDATE TEST ID
                                   ;;*****************************************************************
                                   .SBTTL
                                   .SBTTL TEST 125
                                   .SBTTL
3686                               .SBTTL  WRITE AND READ 0'S TO ALL HIGH CACHE  VALID
3687                               .SBTTL  BIT STORE ADDRESS LOCATIONS- SET A
3688                               .SBTTL  (VALID STORE LOCATIONS 4000 TO 7777)
3689                               .SBTTL
3690                               ;;*****************************************************************
3691 020242  000004                    SCPCND          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                       ;ERROR/LOOP ON TEST
      020244  020254                   40$             ;TEST START LOCATION
      020246  060052                   1$-40$+60000-14 ;LOOP ON ERROR START LOCATION
      020250  000000                   0               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      020252  060100                   25$-40$+60000-14 ;LOOP ON ERROR END LOCATION
      020254  012737  001015  177746 40$: MOV #OFF,CCR  ;DISABLE CACHE
      020262  004437  002324           JSR R4,RELCTL   ;LOCATE TEST CODE TO LOW CACHE SPACE
      020266  020454                   10$+2           ;ADDRESS OF START OF NEXT TEST

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

3692 020270  032737  020000  177746     BIT #VSIU,CCR   ;IS SET A BEING USED?
3693 020276  001407                     BEQ 3$          ;YES
3694 020300  052737  000400  177746     BIS #FC,CCR     ;NO; FLUSH CACHE FOR SET A
3695 020306  032737  010000  177746     BIT #VCIP,CCR   ;WAIT TILL FLUSH COMPLETE
3696 020314  001374                     BNE .-6
3697 020316  012737  177777  177752 3$: MOV #-1,CHR     ;LOAD AMR<21:0> WITH 1'S VIA CHR AND CMR
3698                                                    ;REGISTERS, SINCE TDAR WILL BE USED
3699 020324  112737  000374  177751     MOVB #374,CMR+1
3700 020332  012705  070000             MOV #70000,R5   ;;ADDRESS 70000 INTO R5
3701 020336  012703  050000             MOV #50000,R3   ;ADDRESS 50000 INTO R3
3702 020342  012737  000015  177746 1$: MOV #15,CCR     ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3703 020350  112737  000003  177750     MOVB #HODO+TDAR,CMR ;HODO ALLOWS VALID STORE  SET A TO
3704                                                    ;BE WRITTEN TO CMR<12> ONLY DURING
3705                                                    ;THE DESTINATION MEMORY ACCESS.
3706                                                    ;TDAR WILL FORCE A 0 TO BE WRITTEN
3707                                                    ;INTO VALID STORE WHEN A WRITE TO
3708                                                    ;VALID STORE OCCURS
3709 020356  005713                     TST (R3)
```

```
3710 020360  005715                          TST (R5)              ;WRITE A 0 INTO VALID STORE ADDRESS
3711                                                               ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3712 020362  005715                          TST (R5)              ;WRITE VALID STORE DATA INTO CMR<12>
3713                                                               ;FROM VALID STORE ADDRESS LOCATION
3714                                                               ;JUST WRITTEN INTO.
3715 020364  013701  177750                  MOV CMR,R1            ;SAVE CMR DATA
3716
     020370  000240                  25$:    NOP                   ;INSTRUCTION 'JMP 1$' PLACED HERE
     020372  000240                          NOP                   ;FOR  LOOP ON ERROR

3717 020374  105037  177750                  CLRB CMR              ;DISABLE MAINT. MODE
3718 020400  012737  001015  177746          MOV #OFF,CCR          ;DISABLE CACHE
3719 020406  032701  010000                  BIT #VLD,R1           ;CMR<12> SHOULD BE 0.
3720 020412  001410                          BEQ 9$                ;PASS
3721
3722 020414  010537  047322                  MOV R5,CA121          ;SAVE VALID STORE ADDRESS LOCATION
3723                                                               ;USED: CA<12:1>
3724 020420  006237  047322                  ASR CA121             ;PREPARE CA121 FOR TYPEOUT
3725
     020424  104000                          ERROR                         ;ERROR
                                                                           ;-----
     020426  020424                          .-2
3726                                                               ;VALID BITS STORE TESTS
3727                                                               ;READING VALID STORE DATA SET A
3728                                                               ;THRU CMR<12> DID NOT RESULT IN 0.
3729 020430  047322                          CA121                 ;PRINT VALID STORE ADDRESS LOCATION
3730                                                               ;USED: CA<12:1>.
3731 020432  000000                          0
3732                                 ;;;
3733 020434  062705  000002                  9$:     ADD #2,R5             ;NEXT VALID STORE LOCATION
3734 020440  062703  000002                          ADD #2,R3
3735 020444  020527  100000                  CMP R5,#100000        ;HAVE ALL HIGH CACHE ADDRESS LOCATIONS
3736                                                               ;BEEN DONE?
3737 020450  001334                          BNE 1$                ;NO
3738 020452  000240                  10$:    NOP                   ;END OF TEST
3739
3740
3741 020454  005237  001464          T126:   INC $TESTN            ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 126
                                     .SBTTL
3742                                 .SBTTL  WRITE AND READ 1'S TO ALL HIGH CACHE  VALID
3743                                 .SBTTL  BIT STORE ADDRESS LOCATIONS- SET A
3744                                 .SBTTL  (VALID STORE LOCATIONS 4000 TO 7777)
3745                                 .SBTTL
3746                                 ;;*****************************************************************
3747 020460  000004                          SCPCND                ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                   ;ERROR/LOOP ON TEST
     020462  020472                          40$                   ;TEST START LOCATION
     020464  060036                          1$-40$+60000-14       ;LOOP ON ERROR START LOCATION
     020466  000000                          0                     ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     020470  060064                          25$-40$+60000-14      ;LOOP ON ERROR END LOCATION
     020472  012737  001015  177746  40$:    MOV #OFF,CCR          ;DISABLE CACHE
     020500  004437  002324                  JSR R4,RELCTL         ;LOCATE TEST CODE TO LOW CACHE SPACE
     020504  020656                          10$+2                 ;ADDRESS OF START OF NEXT TEST
```

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

3748 020506  032737  020000  177746          BIT #VSIU,CCR           ;IS SET A BEING USED?
3749 020514  001407                          BEQ 3$                  ;YES
3750 020516  052737  000400  177746          BIS #FC,CCR             ;NO; FLUSH CACHE FOR SET A
3751 020524  032737  010000  177746          BIT #VCIP,CCR           ;WAIT TILL FLUSH COMPLETE
3752 020532  001374                          BNE .-6
3753 020534  012705  070000              3$: MOV #70000,R5           ;;ADDRESS 70000 INTO R5
3754 020540  012703  050000                  MOV #50000,R3           ;ADDRESS 50000 INTO R3
3755 020544  012737  000015  177746      1$: MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3756 020552  112737  000002  177750          MOVB #HODO,CMR          ;HODO ALLOWS VALID STORE  SET A TO
3757                                         ;BE WRITTEN TO CMR<12> ONLY DURING
3758                                         ;THE DESTINATION MEMORY ACCESS.
3759 020560  005713                          TST (R3)
3760 020562  005715                          TST (R5)                ;WRITE A 1 INTO VALID STORE ADDRESS
3761                                         ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3762 020564  005715                          TST (R5)                ;WRITE VALID STORE DATA INTO CMR<12>
3763                                         ;FROM VALID STORE ADDRESS LOCATION
3764                                         ;JUST WRITTEN INTO.
3765 020566  013701  177750                  MOV CMR,R1              ;SAVE CMR DATA
3766
     020572  000240                     25$: NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     020574  000240                          NOP                     ;FOR  LOOP ON ERROR

3767 020576  105037  177750                  CLRB CMR                ;DISABLE MAINT. MODE
3768 020602  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
3769 020610  032701  010000                  BIT #VLD,R1             ;CMR<12> SHOULD BE 1.
3770 020614  001010                          BNE 9$                  ;PASS
3771
3772 020616  010537  047322                  MOV R5,CA121            ;SAVE VALID STORE ADDRESS LOCATION
3773                                         ;USED: CA<12:1>
3774 020622  006237  047322                  ASR CA121               ;PREPARE CA121 FOR TYPEOUT
3775
     020626  104000                          ERROR                           ;ERROR
                                             ;-----
     020630  020626                          .-2
3776                                         ;VALID BITS STORE TESTS
3777                                         ;READING VALID STORE DATA SET A
3778                                         ;THRU CMR<12> DID NOT RESULT IN 0.
3779 020632  047322                          CA121                   ;PRINT VALID STORE ADDRESS LOCATION
3780                                         ;USED: CA<12:1>.
3781 020634  000000                          0
3782                                 ;;;
3783 020636  062705  000002              9$: ADD #2,R5               ;NEXT VALID STORE LOCATION
3784 020642  062703  000002                  ADD #2,R3
3785 020646  020527  100000                  CMP R5,#100000          ;HAVE ALL HIGH CACHE ADDRESS LOCATIONS
3786                                         ;BEEN DONE?
3787 020652  001334                          BNE 1$                  ;NO
3788 020654  000240                     10$: NOP                ;END OF TEST
3789
3790
3791 020656  005237  001464          T127:   INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 127
                                     .SBTTL
```

```
                                .SBTTL   VERIFY VALID DATA STORE ADDRESS LINES (CA<12:1>)
                                .SBTTL
                                .SBTTL
                                ;;*****************************************************************
020662  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
020664  020674                          40$                     ;TEST START LOCATION
020666  070054                          1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
020670  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
020672  070130                          25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
020674  012737  001015  177746    40$:  MOV #OFF,CCR            ;DISABLE CACHE
020702  004437  002352                  JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
020706  021124                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

020710  032737  020000  177746          BIT #VSIU,CCR           ;IS SET A BEING USED?
020716  001407                          BEQ 3$                  ;YES
020720  052737  000400  177746          BIS #FC,CCR             ;NO; FLUSH CACHE FOR SET A
020726  032737  010000  177746          BIT #VCIP,CCR           ;WAIT TILL FLUSH COMPLETE
020734  001374                          BNE .-6
020736  012737  000002  047332    3$:   MOV #2,FLTPAT           ;1ST FLOATING CACHE DATA STORE ADDRESS PA TERN
020744  012702  040000          2$:   MOV #40000,R2           ;
020750  012703  060000                  MOV #60000,R3           ;
020754  063702  047332                  ADD FLTPAT,R2           ;R2 CONTAINS 40000+FLTPAT
020760  063703  047332                  ADD FLTPAT,R3           ;R3 CONTAINS 60000+FLTPAT
020764  112737  000002  177750    1$:   MOVB #HODO,CMR          ;HODO ALLOWS VALID DATA STORE BITS TO BE
                                                                ;WRITTEN TO CMR<12> ONLY DURING THE
                                                                ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
020772  012737  000015  177746          MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE VALID STORE
021000  152737  000001  177750          BISB #TDAR,CMR          ;TDAR WILL FORCE A 0 TO BE WRITTEN
                                                                ;INTO VALID STORE WHEN A WRITE TO
                                                                ;VALID STORE OCCURS.
021006  005737  040000                  TST 40000
021012  005737  060000                  TST 60000               ;WRITE 0 INTO VALID STORE LOCATION 0000.
021016  142737  000001  177750          BICB #TDAR,CMR          ;CLEARING TDAR WILL ALLOW A 1 TO BE
                                                                ;WRITTEN INTO VALID STORE WHEN A WRITE
                                                                ;TO VALID STORE OCCURS.
021024  005712                          TST (R2)
021026  005713                          TST (R3)                ;WRITE 1 INTO VALID STORE LOCATION
                                                                ;SPECIFIED BY R3'S BITS 1 THRU 12:CA<12:1>.
021030  005737  060000                  TST 60000               ;LOAD DATA FROM VALID DATA STORE LOCATION
                                                                ;0000 INTO CMR<12>.
021034  013701  177750                  MOV CMR,R1              ;SAVE CMR DATA

021040  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
021042  000240                          NOP                     ;FOR  LOOP ON ERROR

021044  105037  177750                  CLRB CMR                ;DISABLE MAINT. MODE
021050  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
021056  032701  010000                  BIT #VLD,R1             ;CMR<12> SHOULD READ 0.
021062  001411                          BEQ 9$                  ;PASS

                                ;  ROUTINE
021064  013737  047332  047322          MOV FLTPAT,CA121        ;SAVE CA<12:1> USED
021072  006237  047322                  ASR CA121               ;PREPARE CA121 FOR TYPEOUT
```

```
3834
     021076  104000                          ERROR                           ;ERROR
                                                                             ;-----
     021100  021076                          .-2
3835                                                        ;VALID STOR ADDRESS VERIFICATION.
3836                                                        ;VALID STORE LOCATION 0000 DID NOT
3837                                                        ;READ AS A 0 INDICATING THAT IT WAS
3838                                                        ;OVERWRITTEN WITH A 1. THIS SUGGESTS
3839                                                        ;A BAD CA<12:1> VALID STORE ADDRESS
3840                                                        ;LINE.
3841 021102  047322                          CA121          ;PRINT VALID STORE ADDRESS FAILURE: CA<12:1>.
3842                                                        ;NOTE THAT THE 1 IN THIS PATTERN
3843                                                        ;WILL POINT TO THE ADDRESS LINE OF
3844                                                        ;THAT BROUGHT OUT ERROR.
3845 021104  000000                          0
3846                                ;;;
3847 021106  006337  047332            9$:   ASL FLTPAT                      ;NEXT PATTERN
3848 021112  022737  020000  047332          CMP #20000,FLTPAT               ;HAS VALID DATA STORE  ADDRESS 4000 BEEN DONE?
3849 021120  001311                          BNE 2$                          ;NO
3850 021122  000240                    10$:  NOP                 ;END OF TEST
3851
3852
3853
3854                                .SBTTL *
3855                                .SBTTL
3856                                .SBTTL *              FLUSH CACHE INVALIDATION TEST- VALID STORE SET A
3857                                .SBTTL
3858                                .SBTTL *
3859
3860
3861
3862
3863 021124  005237  001464          T130:           INC $TESTN              ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 130
                                    .SBTTL
3864                                .SBTTL  VERIFY THAT ALL LOW CACHE VALID STORE SET A ADDRESS LOCATIONS
3865                                .SBTTL  WILL BE INVALIDATED AS A RESULT OF A CACHE FLUSH.
3866                                .SBTTL  (FLUSH COUNTER ADDRESS LOCATIONS [CNT<12:1>]: 0000-3777)
3867                                .SBTTL
3868                                ;;*****************************************************************
3869
3870 021130  000004                          SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                             ;ERROR/LOOP ON TEST
     021132  021142                          40$                             ;TEST START LOCATION
     021134  070074                          1$-40$+70000-14                 ;LOOP ON ERROR START LOCATION
     021136  000000                          0                               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     021140  070130                          25$-40$+70000-14                ;LOOP ON ERROR END LOCATION
     021142  012737  001015  177746    40$:  MOV #OFF,CCR                    ;DISABLE CACHE
     021150  004437  002352                  JSR R4,RELCTH                   ;LOCATE TEST CODE TO HIGH CACHE SPACE
     021154  021402                          10$+2                           ;ADDRESS OF START OF NEXT TEST

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

```
3872 021156  012705  060000                    MOV #60000,R5          ;;ADDRESS 60000 INTO R5
3873 021162  012703  040000                    MOV #40000,R3          ;ADDRESS 40000 INTO R3
3874 021166  032737  020000  177746            BIT #VSIU,CCR          ;IS SET A BEING USED?
3875 021174  001407                            BEQ 3$                 ;YES
3876 021176  052737  000400  177746            BIS #FC,CCR            ;NO; FLUSH CACHE FOR SET A
3877 021204  C32737  010000  177746            BIT #VCIP,CCR          ;WAIT TILL FLUSH COMPLETE
3878 021212  001374                            BNE .-6
3879 021214  012737  000015  177746     3$:    MOV #15,CCR            ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3880 021222  112737  000002  177750            MOVB #HODO,CMR         ;HODO ALLOWS VALID STORE  SET A TO
3881                                            ;BE WRITTEN TO CMR<12> ONLY DURING
3882                                            ;THE DESTINATION MEMORY ACCESS.
3883 021230  005713                     4$:    TST (R3)
3884 021232  005715                            TST (R5)               ;WRITE A 1 INTO VALID STORE ADDRESS
3885                                            ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3886 021234  062705  000002                    ADD #2,R5              ;NEXT VALID STORE LOCATION
3887 021240  062703  000002                    ADD #2,R3
3888 021244  020527  070000                    CMP R5,#70000          ;HAVE ALL LOW CACHE LOCATIONS BEEN DONE?
3889 021250  001367                            BNE 4$                 ;NO
3890 021252  052737  000400  177746     1$:    BIS #FC,CCR            ;FLUSH CACHE TO SELECT SET B AND
3891                                            ;INVALIDATE SET A
3892 021260  032737  010000  177746            BIT #VCIP,CCR          ;WAIT TILL FLUSH COMPLETE
3893 021266  001374                            BNE .-6
3894 021270  052737  000400  177746            BIS #FC,CCR            ;FLUSH TO SELECT SET A AGAIN
3895 021276  032737  010000  177746            BIT #VCIP,CCR          ;WAIT
3896 021304  001374                            BNE .-6
3897
     021306  000240                    25$:    NOP                    ;INSTRUCTION 'JMP 1$' PLACED HERE
     021310  000240                            NOP                    ;FOR  LOOP ON ERROR

3898
3899 021312  012705  060000                    MOV #60000,R5          ;ADDRESS 60000 INTO R5
3900 021316  005715                     2$:    TST (R5)               ;WRITE VALID STORE DATA INTO CMR<12>
3901                                            ;FROM ADDRESS LOCATION SPECIFIED BY
3902                                            ;R5'S BITS 12-1.
3903 021320  013701  177750                    MOV CMR,R1             ;SAVE CMR DATA
3904 021324  032701  010000                    BIT #VLD,R1            ;CMR<12> SHOULD BE 0
3905 021330  001416                            BEQ 9$                 ;PASS
3906 021332  105037  177750                    CLRB CMR               ;DISABLE MAINT. MODE
3907 021336  012737  001015  177746            MOV #OFF,CCR           ;DISABLE CACHE
3908
3909 021344  010537  047330                    MOV R5,CNT121          ;SAVE VALID STORE FLUSH ADDRESS LOCATION
3910                                            ;USED: CNT<12:1>
3911 021350  006237  047330                    ASR CNT121             ;PREPARE CNT121 FOR TYPEOUT
3912
     021354  104000                            ERROR                          ;ERROR
                                                                               ;-----
     021356  021354                            .-2
3913                                            ;FLUSH CACHE INVALID TEST-SET A
3914                                            ;READING VALID STORE LOCATION FROM SET A THRU CMR<12
3915                                            ;DID NOT RESULT IN A ZERO,INDICATING THAT
3916                                            ;THE CACHE FLUSH DID NOT INVALIDATE THIS
3917                                            ; LOCATION.
3918 021360  047330                            CNT121                 ;PRINT VALID STORE FLUSH ADDRESS LOCATION
3919                                            ;IN ERROR: CNT<12:1>.
3920 021362  000000                            0
3921 021364  000405                            BR 10$                 ;IF ERROR, END TEST
3922                                    :::
```

```
3923 021366  062705  000002                9$:     ADD #2,R5                       ;NEXT VALID STORE LOCATION
3924 021372  020527  070000                        CMP R5,#70000                   ;HAVE ALL LOW CACHE ADDRESS LOCATIONS
3925                                                                               ;BEEN DONE?
3926 021376  001347                                BNE 2$                          ;NO
3927 021400  000240                        10$:    NOP                  ;END OF TEST
3928
3929
3930
3931 021402  005237  001464          T131:         INC $TESTN                      ;UPDATE TEST ID
                                      ;;*****************************************************************
                                      .SBTTL
                                      .SBTTL TEST 131
                                      .SBTTL
3932                                  .SBTTL  VERIFY THAT ALL HI CACHE VALID STORE SET A ADDRESS LOCATIONS
3933                                  .SBTTL  WILL BE INVALIDATED AS A RESULT OF A CACHE FLUSH.
3934                                  .SBTTL  (FLUSH COUNTER ADDRESS LOCATIONS [CNT<12:1>]: 4000-7777)
3935                                  .SBTTL
3936                                  ;;*****************************************************************
3937
3938
3939 021406  000004                                SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                   ;ERROR/LOOP ON TEST
     021410  021420                                40$                             ;TEST START LOCATION
     021412  060074                                1$-40$+60000-14                 ;LOOP ON ERROR START LOCATION
     021414  000000                                0                               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     021416  060130                                25$-40$+60000-14                ;LOOP ON ERROR END LOCATION
     021420  012737  001015  177746        40$:    MOV #OFF,CCR                    ;DISABLE CACHE
     021426  004437  002324                        JSR R4,RELCTL                   ;LOCATE TEST CODE TO LOW CACHE SPACE
     021432  021660                                10$+2                           ;ADDRESS OF START OF NEXT TEST

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

3940 021434  012705  070000                        MOV #70000,R5                   ;;ADDRESS 70000 INTO R5
3941 021440  012703  050000                        MOV #50000,R3                   ;ADDRESS 50000 INTO R3
3942 021444  032737  020000  177746                BIT #VSIU,CCR                   ;IS SET A BEING USED?
3943 021452  001407                                BEQ 3$                          ;YES
3944 021454  052737  000400  177746                BIS #FC,CCR                     ;NO; FLUSH CACHE FOR SET A
3945 021462  032737  010000  177746                BIT #VCIP,CCR                   ;WAIT TILL FLUSH COMPLETE
3946 021470  001374                                BNE .-6
3947 021472  012737  000015  177746        3$:     MOV #15,CCR                     ;NO UCB SO AS TO WRITE ENABLE VALID STORE
3948 021500  112737  000002  177750                MOVB #HODO,CMR                  ;HODO ALLOWS VALID STORE  SET A TO
3949                                                                               ;BE WRITTEN TO CMR<12> ONLY DURING
3950                                                                               ;THE DESTINATION MEMORY ACCESS.
3951 021506  005713                        4$:     TST (R3)
3952 021510  005715                                TST (R5)                        ;WRITE A 1 INTO VALID STORE ADDRESS
3953                                                                               ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
3954 021512  062705  000002                        ADD #2,R5                       ;NEXT VALID STORE LOCATION
3955 021516  062703  000002                        ADD #2,R3
3956 021522  020527  100000                        CMP R5,#100000                  ;HAVE ALL HI CACHE LOCATIONS BEEN DONE?
3957 021526  001367                                BNE 4$                          ;NO
3958 021530  052737  000400  177746        1$:     BIS #FC,CCR                     ;FLUSH CACHE TO SELECT SET B AND
3959                                                                               ;INVALIDATE SET A
3960 021536  032737  010000  177746                BIT #VCIP,CCR                   ;WAIT TILL FLUSH COMPLETE
3961 021544  001374                                BNE .-6
3962 021546  052737  000400  177746                BIS #FC,CCR                     ;FLUSH TO SELECT SET A AGAIN
3963 021554  032737  010000  177746                BIT #VCIP,CCR                   ;WAIT
```

```
3964 021562  001374                          BNE .-6
3965
     021564  000240                  25$:    NOP                 ;INSTRUCTION 'JMP 1$' PLACED HERE
     021566  000240                          NOP                 ;FOR  LOOP ON ERROR
3966
3967 021570  012705  070000                  MOV #70000,R5       ;ADDRESS 70000 INTO R5
3968 021574  005715                  2$:     TST (R5)            ;WRITE VALID STORE DATA INTO CMR<12>
3969                                                             ;FROM ADDRESS LOCATION SPECIFIED BY
3970                                                             ;R5'S BITS 12-1.
3971 021576  013701  177750                  MOV CMR,R1          ;SAVE CMR DATA
3972 021602  032701  010000                  BIT #VLD,R1         ;CMR<12> SHOULD BE 0
3973 021606  001416                          BEQ 9$              ;PASS
3974 021610  105037  177750                  CLRB CMR            ;DISABLE MAINT. MODE
3975 021614  012737  001015  177746          MOV #OFF,CCR        ;DISABLE CACHE
3976
3977 021622  010537  047330                  MOV R5,CNT121       ;SAVE VALID STORE FLUSH ADDRESS LOCATION
3978                                                             ;USED: CNT<12:1>
3979 021626  006237  047330                  ASR CNT121          ;PREPARE CNT121 FOR TYPEOUT
3980
     021632  104000                          ERROR                       ;ERROR
                                                                          ;-----
     021634  021632                          .-2
3981                                                             ;FLUSH CACHE TEST-SET A
3982                                                             ;READING VALID STORE LOCATION FROM SET A THRU CMR<12
3983                                                             ;DID NOT RESULT IN A ZERO,INDICATING THAT
3984                                                             ;THE CACHE FLUSH DID NOT INVALIDATE THIS
3985                                                             ; LOCATION.
3986 021636  047330                          CNT121              ;PRINT VALID STORE FLUSH ADDRESS LOCATION
3987                                                             ;IN ERROR: CNT<12:1>.
3988 021640  000000                          0
3989 021642  000405                          BR 10$              ;IF ERROR, END TEST
3990                                 ;;;
3991 021644  062705  000002          9$:     ADD #2,R5           ;NEXT VALID STORE LOCATION
3992 021650  020527  100000                  CMP R5,#100000      ;HAVE ALL HI CACHE ADDRESS LOCATIONS
3993                                                             ;BEEN DONE?
3994 021654  001347                          BNE 2$              ;NO
3995 021656  000240                  10$:    NOP             ;END OF TEST
3996
3997
3998
3999
4000
4001                                 .SBTTL *
4002                                 .SBTTL
4003                                 .SBTTL *                            VALID BITS STORE TESTS- SET B
4004                                 .SBTTL
4005                                 .SBTTL *
4006
4007
4008
4009 021660  005237  001464          T132:           INC $TESTN          ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 132
                                     .SBTTL
4010                                 .SBTTL  WRITE AND READ 0'S TO ALL LOW CACHE  VALID
```

```
                                .SBTTL  BIT STORE ADDRESS LOCATIONS- SET B
                                .SBTTL  (VALID STORE LOCATIONS 0000 TO 3777)
                                .SBTTL
                                ;;*****************************************************************
021664  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
021666  021676                        40$                     ;TEST START LOCATION
021670  070052                        1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
021672  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
021674  070100                        25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
021676  012737  001015  177746  40$:  MOV #OFF,CCR             ;DISABLE CACHE
021704  004437  002352                JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
021710  022076                        10$+2                   ;ADDRESS OF START OF NEXT TEST

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

021712  032737  020000  177746        BIT #VSIU,CCR           ;IS SET B BEING USED?
021720  001007                        BNE 3$                  ;YES
021722  052737  000400  177746        BIS #FC,CCR             ;NO; FLUSH CACHE FOR SET B
021730  032737  010000  177746        BIT #VCIP,CCR           ;WAIT TILL FLUSH COMPLETE
021736  001374                        BNE .-6
021740  012737  177777  177752  3$:   MOV #-1,CHR             ;LOAD AMR<21:0> WITH 1'S VIA CHR AND CMR
                                                                ;REGISTERS, SINCE TDAR WILL BE USED
021746  112737  000374  177751        MOVB #374,CMR+1
021754  012705  060000                MOV #60000,R5           ;;ADDRESS 60000 INTO R5
021760  012703  040000                MOV #40000,R3           ;ADDRESS 40000 INTO R3
021764  012737  000015  177746  1$:   MOV #15,CCR            ;NO UCB SO AS TO WRITE ENABLE VALID STORE
021772  112737  000003  177750        MOVB #HODO+TDAR,CMR     ;HODO ALLOWS VALID STORE  SET B TO
                                                                ;BE WRITTEN TO CMR<12> ONLY DURING
                                                                ;THE DESTINATION MEMORY ACCESS.
                                                                ;TDAR WILL FORCE A 0 TO BE WRITTEN
                                                                ;INTO VALID STORE WHEN A WRITE TO
                                                                ;VALID STORE OCCURS
022000  005713                        TST (R3)
022002  005715                        TST (R5)                ;WRITE A 0 INTO VALID STORE ADDRESS
                                                                ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
022004  005715                        TST (R5)                ;WRITE VALID STORE DATA INTO CMR<12>
                                                                ;FROM VALID STORE ADDRESS LOCATION
                                                                ;JUST WRITTEN INTO.
022006  013701  177750                MOV CMR,R1              ;SAVE CMR DATA

022012  000240                25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
022014  000240                        NOP                     ;FOR  LOOP ON ERROR

022016  105037  177750                CLRB CMR                ;DISABLE MAINT. MODE
022022  012737  001015  177746        MOV #OFF,CCR            ;DISABLE CACHE
022030  032701  010000                BIT #VLD,R1             ;CMR<12> SHOULD BE 0.
022034  001410                        BEQ 9$                  ;PASS

022036  010537  047322                MOV R5,CA121            ;SAVE VALID STORE ADDRESS LOCATION
                                                                ;USED: CA<12:1>
022042  006237  047322                ASR CA121               ;PREPARE CA121 FOR TYPEOUT

022046  104000                        ERROR                           ;ERROR
                                                                        ;-----
022050  022046                        .-2
```

```
4050                                                    ;VALID BITS STORE TESTS-SET B
4051                                                    ;READING VALID STORE DATA SET B
4052                                                    ;THRU CMR<12> DID NOT RESULT IN 0.
4053 022052  047322                    CA121            ;PRINT VALID STORE ADDRESS LOCATION
4054                                                    ;USED: CA<12:1>.
4055 022054  000000                    0
4056                                ;;;
4057 022056  062705  000002        9$:  ADD #2,R5        ;NEXT VALID STORE LOCATION
4058 022062  062703  000002             ADD #2,R3
4059 022066  020527  070000             CMP R5,#70000    ;HAVE ALL LOW CACHE ADDRESS LOCATIONS
4060                                                    ;BEEN DONE?
4061 022072  001334                     BNE 1$           ;NO
4062 022074  000240                10$: NOP              ;END OF TEST
4063
4064
4065 022076  005237  001464        T133: INC $TESTN      ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 133
                                    .SBTTL
4066                                .SBTTL  WRITE AND READ 1'S TO ALL LOW CACHE  VALID
4067                                .SBTTL  BIT STORE ADDRESS LOCATIONS- SET B
4068                                .SBTTL  (VALID STORE LOCATIONS 0000 TO 3777)
4069                                .SBTTL
4070                                ;;*****************************************************************
4071 022102  000004                     SCPCND           ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                        ;ERROR/LOOP ON TEST
      022104  022114                     40$              ;TEST START LOCATION
      022106  070036                     1$-40$+70000-14  ;LOOP ON ERROR START LOCATION
      022110  000000                     0                ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      022112  070064                     25$-40$+70000-14 ;LOOP ON ERROR END LOCATION
      022114  012737  001015  177746 40$: MOV #OFF,CCR      ;DISABLE CACHE
      022122  004437  002352             JSR R4,RELCTH    ;LOCATE TEST CODE TO HIGH CACHE SPACE
      022126  022300                     10$+2            ;ADDRESS OF START OF NEXT TEST

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

4072 022130  032737  020000  177746      BIT #VSIU,CCR    ;IS SET B BEING USED?
4073 022136  001007                     BNE 3$           ;YES
4074 022140  052737  000400  177746     BIS #FC,CCR      ;NO; FLUSH CACHE FOR SET B
4075 022146  032737  010000  177746     BIT #VCIP,CCR    ;WAIT TILL FLUSH COMPLETE
4076 022154  001374                     BNE .-6
4077 022156  012705  060000        3$:  MOV #60000,R5    ;;ADDRESS 60000 INTO R5
4078 022162  012703  040000             MOV #40000,R3    ;ADDRESS 40000 INTO R3
4079 022166  012737  000015  177746 1$:  MOV #15,CCR      ;NO UCB SO AS TO WRITE ENABLE VALID STORE
4080 022174  112737  000002  177750     MOVB #HODO,CMR   ;HODO ALLOWS VALID STORE  SET B TO
4081                                                    ;BE WRITTEN TO CMR<12> ONLY DURING
4082                                                    ;THE DESTINATION MEMORY ACCESS.
4083 022202  005713                     TST (R3)
4084 022204  005715                     TST (R5)         ;WRITE A 1 INTO VALID STORE ADDRESS
4085                                                    ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
4086 022206  005715                     TST (R5)         ;WRITE VALID STORE DATA INTO CMR<12>
4087                                                    ;FROM VALID STORE ADDRESS LOCATION
4088                                                    ;JUST WRITTEN INTO.
4089 022210  013701  177750             MOV CMR,R1       ;SAVE CMR DATA
4090
```

```
      022214  000240                        25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      022216  000240                                NOP                     ;FOR  LOOP ON ERROR

 4091 022220  105037  177750                        CLRB CMR                ;DISABLE MAINT. MODE
 4092 022224  012737  001015  177746                MOV #OFF,CCR            ;DISABLE CACHE
 4093 022232  032701  010000                        BIT #VLD,R1             ;CMR<12> SHOULD BE 1.
 4094 022236  001010                                BNE 9$                  ;PASS
 4095
 4096 022240  010537  047322                        MOV R5,CA121            ;SAVE VALID STORE ADDRESS LOCATION
 4097                                                                        ;USED: CA<12:1>
 4098 022244  006237  047322                        ASR CA121               ;PREPARE CA121 FOR TYPEOUT
 4099
      022250  104000                                ERROR                           ;ERROR
                                                                                     ;-----
      022252  022250                                .-2
 4100                                                                       ;VALID BITS STORE TESTS - SET B
 4101                                                                       ;READING VALID STORE DATA SET B
 4102                                                                       ;THRU CMR<12> DID NOT RESULT IN 1.
 4103 022254  047322                                CA121                   ;PRINT VALID STORE ADDRESS LOCATION
 4104                                                                       ;USED: CA<12:1>.
 4105 022256  000000                                0
 4106                                    ;;;
 4107 022260  062705  000002                9$:     ADD #2,R5               ;NEXT VALID STORE LOCATION
 4108 022264  062703  000002                        ADD #2,R3
 4109 022270  020527  070000                        CMP R5,#70000           ;HAVE ALL LOW CACHE ADDRESS LOCATIONS
 4110                                                                       ;BEEN DONE?
 4111 022274  001334                                BNE 1$                  ;NO
 4112 022276  000240                        10$:    NOP             ;END OF TEST
 4113
 4114
 4115
 4116 022300  005237  001464                T134:           INC $TESTN              ;UPDATE TEST ID
                                            ;;*****************************************************************
                                            .SBTTL
                                            .SBTTL TEST 134
                                            .SBTTL
 4117                                       .SBTTL  WRITE AND READ 0'S TO ALL HIGH CACHE  VALID
 4118                                       .SBTTL  BIT STORE ADDRESS LOCATIONS- SET B
 4119                                       .SBTTL  (VALID STORE LOCATIONS 4000 TO 7777)
 4120                                       .SBTTL
 4121                                       ;;*****************************************************************
 4122 022304  000004                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                            ;ERROR/LOOP ON TEST
      022306  022316                                40$                     ;TEST START LOCATION
      022310  060052                                1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
      022312  000000                                0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      022314  060100                                25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
      022316  012737  001015  177746        40$:    MOV #OFF,CCR            ;DISABLE CACHE
      022324  004437  002324                        JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
      022330  022516                                10$+2                   ;ADDRESS OF START OF NEXT TEST

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

 4123 022332  032737  020000  177746                BIT #VSIU,CCR           ;IS SET B BEING USED?
 4124 022340  001007                                BNE 3$                  ;YES
 4125 022342  052737  000400  177746                BIS #FC,CCR             ;NO; FLUSH CACHE FOR SET B
```

```
4126 022350  032737  010000  177746          BIT #VCIP,CCR           ;WAIT TILL FLUSH COMPLETE
4127 022356  001374                          BNE .-6
4128 022360  012737  177777  177752    3$:   MOV #-1,CHR             ;LOAD AMR<21:0> WITH 1'S VIA CHR AND CMR
4129                                                                 ;REGISTERS, SINCE TDAR WILL BE USED
4130 022366  112737  000374  177751          MOVB #374,CMR+1
4131 022374  012705  070000                  MOV #70000,R5           ;;ADDRESS 70000 INTO R5
4132 022400  012703  050000                  MOV #50000,R3           ;ADDRESS 50000 INTO R3
4133 022404  012737  000015  177746    1$:   MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE VALID STORE
4134 022412  112737  000003  177750          MOVB #HODO+TDAR,CMR     ;HODO ALLOWS VALID STORE  SET B TO
4135                                                                 ;BE WRITTEN TO CMR<12> ONLY DURING
4136                                                                 ;THE DESTINATION MEMORY ACCESS.
4137                                                                 ;TDAR WILL FORCE A 0 TO BE WRITTEN
4138                                                                 ;INTO VALID STORE WHEN A WRITE TO
4139                                                                 ;VALID STORE OCCURS
4140 022420  005713                          TST (R3)
4141 022422  005715                          TST (R5)                ;WRITE A 0 INTO VALID STORE ADDRESS
4142                                                                 ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
4143 022424  005715                          TST (R5)                ;WRITE VALID STORE DATA INTO CMR<12>
4144                                                                 ;FROM VALID STORE ADDRESS LOCATION
4145                                                                 ;JUST WRITTEN INTO.
4146 022426  013701  177750                  MOV CMR,R1              ;SAVE CMR DATA
4147
     022432  000240              25$:   NOP                          ;INSTRUCTION 'JMP 1$' PLACED HERE
     022434  000240                     NOP                          ;FOR  LOOP ON ERROR
4148 022436  105037  177750                  CLRB CMR                ;DISABLE MAINT. MODE
4149 022442  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
4150 022450  032701  010000                  BIT #VLD,R1             ;CMR<12> SHOULD BE 0.
4151 022454  001410                          BEQ 9$                  ;PASS
4152
4153 022456  010537  047322                  MOV R5,CA121            ;SAVE VALID STORE ADDRESS LOCATION
4154                                                                 ;USED: CA<12:1>
4155 022462  006237  047322                  ASR CA121               ;PREPARE CA121 FOR TYPEOUT
4156
     022466  104000                          FRROR                           ;ERROR
                                                                             ;-----
     022470  022466                          .-2
4157                                                                 ;VALID BITS STORE TESTS - SET B
4158                                                                 ;READING VALID STORE DATA SET B
4159                                                                 ;THRU CMR<12> DID NOT RESULT IN 0.
4160 022472  047322                          CA121                   ;PRINT VALID STORE ADDRESS LOCATION
4161                                                                 ;USED: CA<12:1>.
4162 022474  000000                          0
4163                                ;;;
4164 022476  062705  000002          9$:     ADD #2,R5               ;NEXT VALID STORE LOCATION
4165 022502  062703  000002                  ADD #2,R3
4166 022506  020527  100000                  CMP R5,#100000          ;HAVE ALL HIGH CACHE ADDRESS LOCATIONS
4167                                                                 ;BEEN DONE?
4168 022512  001334                          BNE 1$                  ;NO
4169 022514  000240                  10$:    NOP             ;END OF TEST
4170
4171
4172 022516  005237  001464          T135:   INC $TESTN              ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 135
                                    .SBTTL
```

```
4173                                    .SBTTL  WRITE AND READ 1'S TO ALL HIGH CACHE  VALID
4174                                    .SBTTL  BIT STORE ADDRESS LOCATIONS- SET B
4175                                    .SBTTL  (VALID STORE LOCATIONS 4000 TO 7777)
4176                                    .SBTTL
4177                                    ;;*****************************************************************
4178 022522  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                         ;ERROR/LOOP ON TEST
      022524  022534                             40$                     ;TEST START LOCATION
      022526  060036                             1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
      022530  000000                             0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      022532  060064                             25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
      022534  012737  001015  177746      40$:   MOV #OFF,CCR            ;DISABLE CACHE
      022542  004437  002324                     JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
      022546  022720                             10$+2                   ;ADDRESS OF START OF NEXT TEST

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

4179 022550  032737  020000  177746              BIT #VSIU,CCR           ;IS SET B BEING USED?
4180 022556  001007                             BNE 3$                  ;YES
4181 022560  052737  000400  177746              BIS #FC,CCR             ;NO; FLUSH CACHE FOR SET B
4182 022566  032737  010000  177746              BIT #VCIP,CCR           ;WAIT TILL FLUSH COMPLETE
4183 022574  001374                             BNE .-6
4184 022576  012705  070000              3$:    MOV #70000,R5           ;;ADDRESS 70000 INTO R5
4185 022602  012703  050000                     MOV #50000,R3           ;ADDRESS 50000 INTO R3
4186 022606  012737  000015  177746      1$:    MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE VALID STORE
4187 022614  112737  000002  177750             MOVB #HODO,CMR          ;HODO ALLOWS VALID STORE  SET B TO
4188                                                                     ;BE WRITTEN TO CMR<12> ONLY DURING
4189                                                                     ;THE DESTINATION MEMORY ACCESS.
4190 022622  005713                             TST (R3)
4191 022624  005715                             TST (R5)                ;WRITE A 1 INTO VALID STORE ADDRESS
4192                                                                     ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
4193 022626  005715                             TST (R5)                ;WRITE VALID STORE DATA INTO CMR<12>
4194                                                                     ;FROM VALID STORE ADDRESS LOCATION
4195                                                                     ;JUST WRITTEN INTO.
4196 022630  013701  177750                     MOV CMR,R1              ;SAVE CMR DATA
4197
      022634  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      022636  000240                             NOP                     ;FOR  LOOP ON ERROR

4198 022640  105037  177750                     CLRB CMR                ;DISABLE MAINT. MODE
4199 022644  012737  001015  177746             MOV #OFF,CCR            ;DISABLE CACHE
4200 022652  032701  010000                     BIT #VLD,R1             ;CMR<12> SHOULD BE 1.
4201 022656  001010                             BNE 9$                  ;PASS
4202
4203 022660  010537  047322                     MOV R5,CA121            ;SAVE VALID STORE ADDRESS LOCATION
4204                                                                     ;USED: CA<12:1>
4205 022664  006237  047322                     ASR CA121               ;PREPARE CA121 FOR TYPEOUT
4206
      022670  104000                             ERROR                           ;ERROR
                                                                                 ;-----
      022672  022670                             .-2
4207                                                                    ;VALID STORE BIT TEST- SET B
4208                                                                    ;READING VALID STORE DATA SET B
4209                                                                    ;THRU CMR<12> DID NOT RESULT IN 0.
4210 022674  047322                             CA121                   ;PRINT VALID STORE ADDRESS LOCATION
4211                                                                    ;USED: CA<12:1>.
```

```
4212 022676  000000                              0
4213                                 ;;;
4214 022700  062705  000002          9$:         ADD #2,R5                ;NEXT VALID STORE LOCATION
4215 022704  062703  000002                      ADD #2,R3
4216 022710  020527  100000                      CMP R5,#100000           ;HAVE ALL HIGH CACHE ADDRESS LOCATIONS
4217                                             ;BEEN DONE?
4218 022714  001334                              BNE 1$                   ;NO
4219 022716  000240                  10$:        NOP                ;END OF TEST
4220
4221
4222 022720  005237  001464          T136:       INC $TESTN               ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 136
                                     .SBTTL
4223                                 .SBTTL   VERIFY VALID DATA STORE ADDRESS LINES (CA<12:1>) -  SET B
4224                                 .SBTTL
4225                                 .SBTTL
4226                                 ;;*****************************************************************
4227 022724  000004                              SCPCND                   ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                          ;ERROR/LOOP ON TEST
      022726  022736                             40$                      ;TEST START LOCATION
      022730  070054                             1$-40$+70000-14          ;LOOP ON ERROR START LOCATION
      022732  000000                             0                        ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      022734  070130                             25$-40$+70000-14         ;LOOP ON ERROR END LOCATION
      022736  012737  001015  177746  40$:       MOV #OFF,CCR             ;DISABLE CACHE
      022744  004437  002352                     JSR R4,RELCTH            ;LOCATE TEST CODE TO HIGH CACHE SPACE
      022750  023166                             10$+2                    ;ADDRESS OF START OF NEXT TEST

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

4228 022752  032737  020000  177746          BIT #VSIU,CCR            ;IS SET B BEING USED?
4229 022760  001007                          BNE 3$                   ;YES
4230 022762  052737  000400  177746          BIS #FC,CCR              ;NO; FLUSH CACHE FOR SET B
4231 022770  032737  010000  177746          BIT #VCIP,CCR            ;WAIT TILL FLUSH COMPLETE
4232 022776  001374                          BNE .-6
4233 023000  012737  000002  047332  3$:     MOV #2,FLTPAT            ;1ST FLOATING CACHE DATA STORE ADDRESS PATTERN
4234 023006  012702  040000          2$:     MOV #40000,R2            ;
4235 023012  012703  060000                  MOV #60000,R3            ;
4236 023016  063702  047332                  ADD FLTPAT,R2            ;R2 CONTAINS 40000+FLTPAT
4237 023022  063703  047332                  ADD FLTPAT,R3            ;R3 CONTAINS 60000+FLTPAT
4238 023026  112737  000002  177750  1$:     MOVB #HODO,CMR           ;HODO ALLOWS VALID DATA STORE BITS TO BE
4239                                         ;WRITTEN TO CMR<12> ONLY DURING THE
4240                                         ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
4241 023034  012737  000015  177746          MOV #15,CCR              ;NO UCB SO AS TO WRITE ENABLE VALID STORE
4242 023042  152737  000001  177750          BISB #TDAR,CMR           ;TDAR WILL FORCE A 0 TO BE WRITTEN
4243                                         ;INTO VALID STORE WHEN A WRITE TO
4244                                         ;VALID STORE OCCURS.
4245 023050  005737  040000                  TST 40000
4246 023054  005737  060000                  TST 60000
4247 023060  142737  000001  177750          BICB #TDAR,CMR           ;WRITE 0 INTO VALID STORE LOCATION 0000.
4248                                         ;CLEARING TDAR WILL ALLOW A 1 TO BE
4249                                         ;WRITTEN INTO VALID STORE WHEN A WRITE
                                             ;TO VALID STORE OCCURS.
4250 023066  005712                          TST (R2)
4251 023070  005713                          TST (R3)                 ;WRITE 1 INTO VALID STORE LOCATION
4252                                         ;SPECIFIED BY R3'S BITS 1 THRU 12:CA<12:1>.
```

```
4253 023072  005737  060000                        TST 60000               ;LOAD DATA FROM VALID DATA STORE LOCATION
4254                                                                       ;0000 INTO CMR<12>.
4255 023076  013701  177750                        MOV CMR,R1              ;SAVE CMR DATA
4256
     023102  000240                        25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     023104  000240                                NOP                     ;FOR  LOOP ON ERROR

4257 023106  105037  177750                        CLRB CMR                ;DISABLE MAINT. MODE
4258 023112  012737  001015  177746                MOV #OFF,CCR            ;DISABLE CACHE
4259 023120  032701  010000                        BIT #VLD,R1             ;CMR<12> SHOULD READ 0.
4260 023124  001411                                BEQ 9$                  ;PASS
4261
4262                                       ;  ROUTINE
4263 023126  013737  047332  047322                MOV FLTPAT,CA121        ;SAVE CA<12:1> USED
4264 023134  006237  047322                        ASR CA121               ;PREPARE CA121 FOR TYPEOUT
4265
     023140  104000                                ERROR                           ;ERROR
                                                                                    ;-----
     023142  023140                                .-2
4266                                                                       ;VALID STORE ADDRESS VERIFICATION- SET B
4267                                                                       ;VALID STORE LOCATION 0000 DID NOT
4268                                                                       ;READ AS A 0 INDICATING THAT IT WAS
4269                                                                       ;OVERWRITTEN WITH A 1. THIS SUGGESTS
4270                                                                       ;A BAD CA<12:1> VALID STORE ADDRESS
4271                                                                       ;LINE.
4272 023144  047322                                CA121                   ;PRINT VALID STORE ADDRESS FAILURE: CA<12:1>.
4273                                                                       ;NOTE THAT THE 1 IN THIS PATTERN
4274                                                                       ;WILL POINT TO THE ADDRESS LINE
4275                                                                       ;THAT BROUGHT OUT ERROR.
4276 023146  000000                                0
4277                                       ;;;
4278 023150  006337  047332                9$:     ASL FLTPAT              ;NEXT PATTERN
4279 023154  022737  020000  047332                CMP #20000,FLTPAT       ;HAS VALID DATA STORE  ADDRESS 4000 BEEN DONE?
4280 023162  001311                                BNE 2$                  ;NO
4281 023164  000240                        10$:    NOP             ;END OF TEST
4282
4283
4284
4285                                       .SBTTL *
4286                                       .SBTTL
4287                                       .SBTTL *                FLUSH CACHE INVALIDATION TEST- VALID STORE SET B
4288                                       .SBTTL
4289                                       .SBTTL *
4290
4291
4292
4293
4294 023166  005237  001464                T137:           INC $TESTN              ;UPDATE TEST ID
                                           ;;*************************************************************
                                           .SBTTL
                                           .SBTTL TEST 137
                                           .SBTTL
4295                                       .SBTTL  VERIFY THAT ALL LOW CACHE VALID STORE SET B ADDRESS LOCATIONS
4296                                       .SBTTL  WILL BE INVALIDATED AS A RESULT OF A CACHE FLUSH.
4297                                       .SBTTL  (FLUSH COUNTER ADDRESS LOCATIONS [CNT<12:1>]: 0000-3777)
4298                                       .SBTTL
4299                                       ;;*************************************************************
```

```
4300
4301 023172  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     023174  023204                          40$                     ;TEST START LOCATION
     023176  070074                          1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     023200  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     023202  070130                          25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     023204  012737  001015  177746  40$:    MOV #OFF,CCR            ;DISABLE CACHE
     023212  004437  002352                  JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     023216  023444                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

4302 023220  012705  060000                  MOV #60000,R5           ;;ADDRESS 60000 INTO R5
4303 023224  012703  040000                  MOV #40000,R3           ;ADDRESS 40000 INTO R3
4304 023230  032737  020000  177746          BIT #VSIU,CCR           ;IS SET B BEING USED?
4305 023236  001007                          BNE 3$                  ;YES
4306 023240  052737  000400  177746          BIS #FC,CCR             ;NO; FLUSH CACHE FOR SET B
4307 023246  032737  010000  177746          BIT #VCIP,CCR           ;WAIT TILL FLUSH COMPLETE
4308 023254  001374                          BNE .-6
4309 023256  012737  000015  177746  3$:     MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE VALID STORE
4310 023264  112737  000002  177750          MOVB #HODO,CMR          ;HODO ALLOWS VALID STORE  SET B TO
4311                                         ;BE WRITTEN TO CMR<12> ONLY DURING
4312                                         ;THE DESTINATION MEMORY ACCESS.
4313 023272  005713                  4$:     TST (R3)
4314 023274  005715                          TST (R5)                ;WRITE A 1 INTO VALID STORE ADDRESS
4315                                         ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
4316 023276  062705  000002                  ADD #2,R5               ;NEXT VALID STORE LOCATION
4317 023302  062703  000002                  ADD #2,R3
4318 023306  020527  070000                  CMP R5,#70000           ;HAVE ALL LOW CACHE LOCATIONS BEEN DONE?
4319 023312  001367                          BNE 4$                  ;NO
4320 023314  052737  000400  177746  1$:     BIS #FC,CCR             ;FLUSH CACHE TO SELECT SET A AND
4321                                         ;INVALIDATE SET B
4322 023322  032737  010000  177746          BIT #VCIP,CCR           ;WAIT TILL FLUSH COMPLETE
4323 023330  001374                          BNE .-6
4324 023332  052737  000400  177746          BIS #FC,CCR             ;FLUSH TO SELECT SET B AGAIN
4325 023340  032737  010000  177746          BIT #VCIP,CCR           ;WAIT
4326 023346  001374                          BNE .-6
4327
     023350  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     023352  000240                          NOP                     ;FOR  LOOP ON ERROR

4328
4329 023354  012705  060000                  MOV #60000,R5           ;ADDRESS 60000 INTO R5
4330 023360  005715                  2$:     TST (R5)                ;WRITE VALID STORE DATA INTO CMR<12>
4331                                         ;FROM ADDRESS LOCATION SPECIFIED BY
4332                                         ;R5'S BITS 12-1.
4333 023362  013701  177750                  MOV CMR,R1              ;SAVE CMR DATA
4334 023366  032701  010000                  BIT #VLD,R1             ;CMR<12> SHOULD BE 0
4335 023372  001416                          BEQ 9$                  ;PASS
4336 023374  105037  177750                  CLRB CMR                ;DISABLE MAINT MODE
4337 023400  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
4338 023406  010537  047330                  MOV R5,CNT121           ;SAVE VALID STORE FLUSH ADDRESS LOCATION
4339                                         ;USED: CNT<12:1>
4340 023412  006237  047330                  ASR CNT121              ;PREPARE CNT121 FOR TYPEOUT
4341
```

```
        023416  104000                          ERROR                   ;ERROR
                                                                        ;-----
        023420  023416                          .-2
 4342                                                   ;FLUSH CACHE INVALID TEST-SET B
 4343                                                   ;READING VALID STORE LOCATION FROM SET B THRU CMR<12
 4344                                                   ;DID NOT RESULT IN A ZERO,INDICATING THAT
 4345                                                   ;THE CACHE FLUSH DID NOT INVALIDATE THIS
 4346                                                   ; LOCATION.
 4347 023422  047330                          CNT121                  ;PRINT VALID STORE FLUSH ADDRESS LOCATION
 4348                                                   ;IN ERROR: CNT<12:1>.
 4349 023424  000000                          0
 4350 023426  000405                          BR 10$                  ;IF ERROR, END TEST
 4351 023430  062705  000002          9$:     ADD #2,R5               ;NEXT VALID STORE LOCATION
 4352 023434  020527  070000                  CMP R5,#70000           ;HAVE ALL LOW CACHE ADDRESS LOCATIONS
 4353                                                   ;BEEN DONE?
 4354 023440  001347                          BNE 2$                  ;NO
 4355 023442  000240                  10$:    NOP             ;END OF TEST
 4356
 4357
 4358
 4359 023444  005237  001464          T140:   INC $TESTN              ;UPDATE TEST ID
                                      ;;*****************************************************************
                                      .SBTTL
                                      .SBTTL TEST 140
                                      .SBTTL
 4360                                 .SBTTL  VERIFY THAT ALL HI CACHE VALID STORE SET B ADDRESS LOCATIONS
 4361                                 .SBTTL  WILL BE INVALIDATED AS A RESULT OF A CACHE FLUSH.
 4362                                 .SBTTL  (FLUSH COUNTER ADDRESS LOCATIONS [CNT<12:1>]: 4000-7777)
 4363                                 .SBTTL
 4364                                 ;;*****************************************************************
 4365
 4366 023450  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
        023452  023462                          40$                     ;TEST START LOCATION
        023454  060074                          1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
        023456  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
        023460  060130                          25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
        023462  012737  001015  177746  40$:    MOV #OFF,CCR            ;DISABLE CACHE
        023470  004437  002324                  JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
        023474  023722                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

 4367 023476  012705  070000                  MOV #70000,R5           ;;ADDRESS 70000 INTO R5
 4368 023502  012703  050000                  MOV #50000,R3           ;ADDRESS 50000 INTO R3
 4369 023506  032737  020000  177746          BIT #VSIU,CCR           ;IS SET B BEING USED?
 4370 023514  001007                          BNE 3$                  ;YES
 4371 023516  052737  000400  177746          BIS #FC,CCR             ;NO; FLUSH CACHE FOR SET B
 4372 023524  032737  010000  177746          BIT #VCIP,CCR           ;WAIT TILL FLUSH COMPLETE
 4373 023532  001374                          BNE .-6
 4374 023534  012737  000015  177746  3$:     MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE VALID STORE
 4375 023542  112737  000002  177750          MOVB #HODO,CMR          ;HODO ALLOWS VALID STORE  SET B TO
 4376                                                   ;BE WRITTEN TO CMR<12> ONLY DURING
 4377                                                   ;THE DESTINATION MEMORY ACCESS.
 4378 023550  005713                  4$:     TST (R3)
 4379 023552  005715                          TST (R5)                ;WRITE A 1 INTO VALID STORE ADDRESS
```

```
4380
4381 023554  062705  000002                      ADD #2,R5               ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
4382 023560  062703  000002                      ADD #2,R3               ;NEXT VALID STORE LOCATION
4383 023564  020527  100000                      CMP R5,#100000          ;HAVE ALL HI CACHE LOCATIONS BEEN DONE?
4384 023570  001367                              BNE 4$                  ;NO
4385 023572  052737  000400  177746        1$:   BIS #FC,CCR             ;FLUSH CACHE TO SELECT SET A AND
4386                                                                      ;INVALIDATE SET B
4387 023600  032737  010000  177746              BIT #VCIP,CCR           ;WAIT TILL FLUSH COMPLETE
4388 023606  001374                              BNE .-6
4389 023610  052737  000400  177746              BIS #FC,CCR             ;FLUSH TO SELECT SET B AGAIN
4390 023616  032737  010000  177746              BIT #VCIP,CCR           ;WAIT
4391 023624  001374                              BNE .-6
4392
     023626  000240                        25$:   NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     023630  000240                               NOP                     ;FOR  LOOP ON ERROR

4393
4394 023632  012705  070000                      MOV #70000,R5           ;ADDRESS 70000 INTO R5
4395 023636  005715                        2$:   TST (R5)                ;WRITE VALID STORE DATA INTO CMR<12>
4396                                                                      ;FROM ADDRESS LOCATION SPECIFIED BY
4397                                                                      ;R5'S BITS 12-1.
4398 023640  013701  177750                      MOV CMR,R1              ;SAVE CMR DATA
4399 023644  032701  010000                      BIT #VLD,R1             ;CMR<12> SHOULD BE 0
4400 023650  001416                              BEQ 9$                  ;PASS
4401 023652  105037  177750                      CLRB CMR                ;DISABLE MAINT MODE
4402 023656  012737  001015  177746              MOV #OFF,CCR            ;DISABLE CACHE
4403
4404 023664  010537  047330                      MOV R5,CNT121           ;SAVE VALID STORE FLUSH ADDRESS LOCATION
4405                                                                      ;USED: CNT<12:1>
4406 023670  006237  047330                      ASR CNT121              ;PREPARE CNT121 FOR TYPEOUT
4407
     023674  104000                              ERROR                           ;ERROR
                                                                                  ;-----
     023676  023674                              .-2
4408                                                                      ;FLUSH CACHE INVALID TEST-SET B
4409                                                                      ;READING VALID STORE LOCATION FROM SET B THRU CMR<12
4410                                                                      ;DID NOT RESULT IN A ZERO,INDICATING THAT
4411                                                                      ;THE CACHE FLUSH DID NOT INVALIDATE THIS
4412                                                                      ; LOCATION.
4413 023700  047330                              CNT121                  ;PRINT VALID STORE FLUSH ADDRESS LOCATION
4414                                                                      ;IN ERROR: CNT<12:1>.
4415 023702  000000                              0
4416 023704  000405                              BR 10$                  ;IF ERROR,END TEST
4417 023706  062705  000002                  9$:  ADD #2,R5               ;NEXT VALID STORE LOCATION
4418 023712  020527  100000                      CMP R5,#100000          ;HAVE ALL HI CACHE ADDRESS LOCATIONS
4419                                                                      ;BEEN DONE?
4420 023716  001347                              BNE 2$                  ;NO
4421 023720  000240                        10$:  NOP                ;END OF TEST
4422
4423
4424
4425
4426
4427                                  .SBTTL *
4428                                  .SBTTL
4429                                  .SBTTL *              WRITE CONTROL LOGIC TESTS
4430                                  .SBTTL
```

```
                                .SBTTL *
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 141
                                .SBTTL
                                .SBTTL  VERIFY THE FOLLOWING:
                                .SBTTL          1. NO UPDATE OCCURS TO CACHE DATA STORE DUE TO A WRITE MISS
                                .SBTTL          2. UPDATE DOES OCCUR TO CACHE DATA STORE DUE TO A WRITE HIT
                                .SBTTL
                                .SBTTL
                                ;;*****************************************************************
023722  005237  001464        T141:           INC $TESTN              ;UPDATE TEST ID
023726  000004                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
023730  023740                                40$                     ;TEST START LOCATION
023732  070000                                1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
023734  000000                                0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
023736  070064                                25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
023740  012737  001015  177746      40$:      MOV #OFF,CCR            ;DISABLE CACHE
023746  004437  002352                        JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
023752  024146                                10$+2                   ;ADDRESS OF START OF NEXT TEST

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

023754  005037  060000        1$:     CLR 60000               ;0'S TO MAIN MEMORY LOCATION
023760  005037  000000                CLR @#0                 ;CLEAR LOCATION 0
023764  012700  177777                MOV #-1,R0              ;ALL 1'S TO R0
023770  012701  060000                MOV #60000,R1           ;ADDRESS 60000 TO R1
023774  112737  000002  177750        MOVB #HODO,CMR          ;ALLOWS CACHE UPDATES &  DATA STORE BITS TO BE
                                                                ;WRITTEN TO CDR<15:0> ONLY DURING THE
                                                                ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
024002  012737  000015  177746        MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
024010  005737  060000                TST 60000               ;
024014  005737  000000                TST 0                   ;READ UPDATE;  ALL 0'S TO  DATA STORE
                                                                ;LOCATION 0000 FROM MAIN MEMORY
                                                                ;LOC. 0
024020  010011                        MOV R0,(R1)             ;WRITE MISS;NO UPDATE SHOULD OCCUR
                                                                ;TO DATA STORE LOCATION 0000
024022  005711                        TST (R1)                ;READ MISS;LOAD DATA STORE BITS RESULTING
                                                                ;FROM PREVIOUS WRITE MISS INTO CDR<15:0>
024024  013702  177754                MOV CDR,R2              ;SAVE CDR CONTENTS
024030  010011                        MOV R0,(R1)             ;WRITE HIT;
                                                                ;THIS WRITE HIT SHOULD UPDATE DATA
                                                                ;STORE LOCATION 0000.
024032  005711                        TST (R1)                ;READ HIT;LOAD DATA STORE BITS RESULTING
                                                                ;FROM PREVIOUS WRITE HIT INTO CDR<15:0>
024034  013703  177754                MOV CDR,R3              ;SAVE CDR CONTENTS

024040  000240        25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
024042  000240                NOP                             ;FOR  LOOP ON ERROR

024044  105037  177750                CLRB CMR                ;DISABLE MAINTENANCE
024050  012737  001015  177746        MOV #OFF,CCR            ;DISABLE CACHE
```

```
4469 024056  012737  000002  000000          MOV #2,0                ;RESTORE VECTOR
4470 024064  005702                          TST R2                  ;CHECK FOR ALL 0'S
4471 024066  001411                          BEQ 8$                  ;PASS
4472 024070  005037  047320                  CLR EXDAT6              ;SPECIFY EXPECTED DATA
4473 024074  010237  047316                  MOV R2,CDR150           ;GET RECEIVED DATA FROM R2
4474
     024100  104000                          ERROR                           ;ERROR
                                                                             ;-----
     024102  024100                          .-2
4475                                                                 ;WRITE CONTROL LOGIC TEST
4476                                                                 ;READING CDR<15:0> DID NOT RESULT IN ALL 0'S.
4477                                                                 ;INDICATES THAT UPDATE  OCCURED
4478                                                                 ;DUE TO WRITE MISS.
4479 024104  047320                          EXDAT6                  ;PRINT CDR<15:0> EXPECTED DATA
4480 024106  047316                          CDR150                  ;PRINT CDR<15:0> DATA RECEIVED.
4481 024110  000000                          0
4482 024112  022703  177777          8$:     CMP #-1,R3              ;CHECK FOR ALL 1'S
4483 024116  001412                          BEQ 10$                 ;PASS
4484 024120  012737  177777  047320          MOV #-1,EXDAT6          ;SPECIFY EXPECTED DATA
4485 024126  010337  047316                  MOV R3,CDR150           ;GET RECEIVED DATA FROM R3
4486
     024132  104000                          ERROR                           ;ERROR
                                                                             ;-----
     024134  024132                          .-2
4487                                                                 ;WRITE CONTROL LOGIC TEST
4488                                                                 ;READING CDR<15:0> DID NOT RESULT IN ALL 1'S.
4489                                                                 ;INDICATES THAT UPDATE  DID NOT OCCUR
4490                                                                 ;DUE TO WRITE HIT.
4491 024136  047320                          EXDAT6                  ;PRINT CDR<15:0> EXPECTED DATA
4492 024140  047316                          CDR150                  ;PRINT CDR<15:0> DATA RECEIVED.
4493 024142  000000                          0
4494                                                                         ;;;
4495 024144  000240          10$:            NOP             ;END OF TEST
4496
4497
4498
4499
4500 024146  005237  001464          T142:           INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 142
                                     .SBTTL
4501                                 .SBTTL  VERIFY THAT THE WRITE CONTROL LOGIC WILL BE INHIBITED FROM UPDATING
4502                                 .SBTTL  TAG STORE DUE TO A READ HIT.
4503                                 ;;;             PROCEDURE:      CREATE READ HIT TO LOW CACHE WITH FMLO ENABLED.
4504                                 ;;;                             FMLO WILL INHIBIT CPU RESTART SIGNAL SO THAT
4505                                 ;;;                             A POTENTIAL WRITE SIGNAL COULD OCCUR.WRITE
4506                                 ;;;                             CONTROL LOGIC SHOULD BE INHIBITED DUE TO READ
4507                                 ;;;                             HIT.
4508                                 ;;*****************************************************************
4509 024152  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     024154  024164                          40$                     ;TEST START LOCATION
     024156  070000                          1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     024160  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     024162  070064                          25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     024164  012737  001015  177746  40$:     MOV #OFF,CCR            ;DISABLE CACHE
```

```
024172  004437  002352                  JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
024176  024356                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

4510 024200  012737  177777  177752  1$:     MOV #-1,CHR             ;LOAD AMR<8:0> BY WRITING ALL 1'S TO CHR<8:0>
4511 024206  112737  000002  177750          MOVB #HODO,CMR          ;HODO ALLOWS CACHE TAG FIELD BITS TO BE
4512                                                                 ;WRITTEN TO CHR<15:07> ONLY DURING
4513                                                                 ;THE DESTINATION MEMORY ACCESS
4514                                                                 ;OF AN INSTRUCTION
4515 024214  012737  000015  177746          MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE
4516 024222  005737  040000                  TST 40000
4517 024226  005737  000000                  TST 0                   ;READ UPDATE;LOAD TAG STORE WITH ALL 0'S
4518 024232  052737  000001  177750          BIS #TDAR,CMR           ;TDAR WILL ALLOW TAG STORE TO BE
4519                                                                 ;WRITTEN WITH CONTENTS OF AMR<8:0>
4520                                                                 ;IF AN UPDATE OCCURS.
4521 024240  005737  000000                  TST 0                   ;READ HIT; WRITE CONTROL LOGIC SHOULD
4522                                                                 ;BE INHIBITED FROM ISSUING A WRITE
4523                                                                 ;SIGNAL
4524 024244  005737  000000                  TST 0                   ;WRITE TAG FIELD DATA FROM TAG STORE
4525                                                                 ;LOCATION 0000 INTO CHR.
4526 024250  013737  177752  047310          MOV CHR,CHR157          ;SAVE CHR DATA
```

```
4528 024256  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
4529
     024264  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     024266  000240                          NOP                     ;FOR  LOOP ON ERROR

4530 024270  105037  177750                  CLRB CMR                        ;DISABLE MAINTENANCE MODE
4531 024274  042737  000177  047310          BIC #177,CHR157         ;INTERESTED IN 15:07
4532 024302  005737  047310                  TST CHR157                      ;BITS 15:07 SHOULD BE ALL 0'S
4533 024306  001422                          BEQ 10$                 ;PASS
4534 024310  012737  000007  002052          MOV #7,LOOP             ;ERROR;PREPARE CHR157 FOR TYPEOUT
4535 024316  006237  047310          2$:     ASR CHR157
4536 024322  042737  100000  047310          BIC #100000,CHR157
4537 024330  005337  002052                  DEC LOOP
4538 024334  001370                          BNE 2$
4539 024336  005037  047336                  CLR EXDAT3              ;INDICATE EXPECTED DATA
4540
     024342  104000                          ERROR                           ;ERROR
                                                                          ;-----
     024344  024342                          .-2
4541                                                        ;WRITE CONTROL LOGIC TESTS
4542                                                        ;READING TAG STORE DATA THRU CHR<15:07>
4543                                                        ;DID NOT RESULT IN ALL 0'S.
4544                                                        ;THIS SUGGESTS THAT AN UPDATE OCCURED
4545                                                        ;AND WRITE CONTROL LOGIC WAS NOT
4546                                                        ;INHIBITED DUE TO READ HIT.
4547 024346  047336                          EXDAT3                  ;PRINT CHR<15:07> EXPECTED
4548 024350  047310                          CHR157                  ;PRINT CHR<15:07> RECEIVED
4549 024352  000000                          0
4550 024354  000240                  10$:    NOP             ;END OF TEST
4551
4552
4553
4554
4555
4556 024356  005237  001464          T143:           INC $TESTN              ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 143
                                    .SBTTL
4557                                .SBTTL  VERIFY THAT WRITE CONTROL LOGIC WILL INHIBIT A READ UPDATE
4558                                .SBTTL  TO CACHE TAG STORE DUE TO AN ACCESS TO I/O PAGE.
4559                                ;;*****************************************************************
4560 024362  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
     024364  024374                          40$                     ;TEST START LOCATION
     024366  060000                          1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
     024370  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     024372  060042                          25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
     024374  012737  001015  177746  40$:    MOV #OFF,CCR            ;DISABLE CACHE
     024402  004437  002324                  JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
     024406  024556                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

4561 024410  112737  000002  177750  1$:     MOVB #HODO,CMR          ;ALLOWS CACHE TAG FIELD BITS TO BE
4562                                                                ;WRITTEN TO CHR<15:07> ONLY DURING
```

```
4563
4564
4565 024416  012737  000015  177746          MOV #15,CCR          ;THE DESTINATION MEMORY ACCESS
4566 024424  005737  057744                  TST 57744            ;OF AN INSTRUCTION
4567 024430  005737  077744                  TST 77744            ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
4568                                                              ;READ UPDATE;LOAD BIT PATTERN
4569                                                              ;000000011 INTO TAG STORE LOCATION
4570 024434  005737  177744                  TST 177744           ;7762
4571                                                              ;ACCESS I/O PAGE BY READING CCR REGISTER.
4572                                                              ;THE CACHE COULD DO AN UPDATE TO
4573                                                              ;TAG STORE LOCATION 7762 BUT THE ACCESS
4574                                                              ;TO I/O PAGE WILL INHIBIT WRITE CONTROL
4575 024440  005737  057744                  TST 57744            ;LOGIC
4576                                                              ;WRITE TAG STORE DATA FROM  LOCATION
4577 024444  013737  177752  047310          MOV CHR,CHR157       ;7762 INTO CHR<15:07>.
4578                                                              ;SAVE CHR DATA
     024452  000240              25$:        NOP                  ;INSTRUCTION 'JMP 1$' PLACED HERE
     024454  000240                          NOP                  ;FOR  LOOP ON ERROR

4579 024456  105037  177750                  CLRB CMR                    ;DISABLE MAINTENANCE MODE
4580 024462  012737  001015  177746          MOV #OFF,CCR         ;DISABLE CACHE
4581 024470  042737  000177  047310          BIC #177,CHR157      ;PREPARE CHR157 FOR ERROR CHECK
4582 024476  022737  000600  047310          CMP #600,CHR157      ;BITS 15:07 SHOULD BE BIT PATTERN 000000011
4583 024504  001423                          BEQ 10$              ;PASS
4584 024506  012737  000007  002052          MOV #7,LOOP          ;ERROR;PREPARE CHR157 FOR TYPEOUT
4585 024514  006237  047310          2$:     ASR CHR157
4586 024520  042737  100000  047310          BIC #100000,CHR157
4587 024526  005337  002052                  DEC LOOP
4588 024532  001370                          BNE 2$
4589 024534  012737  000003  047336          MOV #3,EXDAT3        ;INDICATE EXPECTED DATA
4590
     024542  104000                          ERROR                       ;ERROR
                                                                         ;-----
     024544  024542                          .-2
4591                                                              ;WRITE CONTROL LOGIC TESTS
4592                                                              ;READING TAGD<21:13> THRU CHR<15:07>
4593                                                              ;DID NOT RESULT IN BIT PATTERN 000000011.
4594 024546  047336                          EXDAT3               ;PRINT CHR 15:07 EXPECTED
4595 024550  047310                          CHR157               ;PRINT CHR <15:07> RECEIVED
4596 024552  000000                          0
4597 024554  000240              10$:        NOP             ;END OF TEST
4598
4599
4600
4601
4602
4603
4604 024556  005237  001464          T144:       INC $TESTN           ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 144
                                    .SBTTL
4605                                .SBTTL  THIS TEST VERIFIES THE AREA OF WRIT CONTROL LOGIC AND VALID
4606                                .SBTTL  STORE LOGIC WHICH IS CONCERNED WITH BYPASS OPERATIONS. A WIRE STRAP
4607                                .SBTTL  IS USED TO ALLOW OR INHIBIT INVALIDATION OF VALID STORE DURING
4608                                .SBTTL  READ BYPASS CONDITIONS. UNLESS SWITCH REGISTER 08 IS IMPLEMENTED,
4609                                .SBTTL  THIS TEST ASSUMES THAT STRAP W1 IS IN PLACE.
```

```
                                .SBTTL
                        ;;;             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.
                        ;;;
                        ;;;*****************************************************************
4621 024562  000004                    SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
     024564  024574                     40$                     ;TEST START LOCATION
     024566  070026                     1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     024570  000000                     0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     024572  070112                     25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     024574  012737  001015  177746  40$:  MOV #OFF,CCR          ;DISABLE CACHE
     024602  004437  002352              JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     024606  025030                     10$+2                   ;ADDRESS OF START OF NEXT TEST

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

4622 024610  032737  020000  177746      BIT #VSIU,CCR           ;IS SET A BEING USED?
4623 024616  001407                      BEQ 1$                  ;YES
4624 024620  052737  000400  177746      BIS #FC,CCR             ;NO,FLUSH CACHE FOR SET A
4625 024626  032737  010000  177746      BIT #VCIP,CCR           ;WAIT TILL FLUSH COMPLETE
4626 024634  001374                      BNE .-6
4627 024636  012737  000015  177746  1$:   MOV #15,CCR          ;NO UCB SO AS TO ENABLE CACHE STORES
4628 024644  112737  000002  177750      MOVB #HODO,CMR          ;HODO ALLOWS READ UPDATES,AND VALID
4629                                                            ;STORE DATA TO BE WRITTEN TO CMR <12>
4630                                                            ;ONLY DURING THE DESTINATION ACCESS
4631                                                            ;OF AN INSTRUCTION.
4632 024652  005737  040000              TST 40000               ;
4633 024656  005737  060000              TST 60000               ;READ UPDATE TO CACHE LOCATION 0000.
4634
4635                                                            ;WRITE 1 INTO VALID STORE LOCATION 0000.
4636 024662  052737  001000  177746      BIS #UCB,CCR            ;BYPASS MODE
4637 024670  005737  040000              TST 40000               ;READ MISS/BYPASS;
4638 024674  005737  060000              TST 60000               ;LOAD VALID STORE LOCATION 0000 DATA
4639                                                            ;RESULTING FROM PREVIOUS READ MISS/BYPASS
4640                                                            ;INTO CMR<12>.
4641                                                            ;THIS IS ALSO A READ HIT/BYPASS CONDITION.
4642 024700  013700  177750              MOV CMR,R0              ;SAVE CMR CONTENTS
4643 024704  005737  040000              TST 40000               ;LOAD VALID STORE LOCATION 0000
4644                                                            ;DATA RESULTING FROM PREVIOUS READ HIT
4645                                                            ;/BYPASS INTO CMR<12>.
4646 024710  013701  177750              MOV CMR,R1              ;SAVE CMR CONTENTS
4647 024714  012737  001015  177746      MOV #OFF,CCR            ;DISABLE CACHE
4648
     024722  000240                  25$:  NOP                   ;INSTRUCTION 'JMP 1$' PLACED HERE
     024724  000240                      NOP                     ;FOR  LOOP ON ERROR

4649 024726  105037  177750              CLRB CMR                ;DISABLE MAINTENANCE MODE
4650 024732  012702  002064              MOV #SWR,R2             ;
4651 024736  032732  000400              BIT #BIT08,@(R2)+       ;IS STRAP W2 IN PLACE
```

```
4652
4653 024742  001015                    BNE 7$                  ;YES
4654 024744  032700  010000             BIT #VLD,R0             ;NO; W1 IS ASSUMED
4655 024750  001003                    BNE 6$                  ;PASS ;VALID DATA IS A 1
4656
     024752  104000                    ERROR                           ;ERROR
                                                                        ;-----
     024754  024752                    .-2
4657                                                            ;WRITE CONTROL LOGIC TESTS
4658                                                            ;STRAP W1 IS ASSUMED IN PLACE.
4659                                                            ;READ MISS/BYPASS CAUSED INVALIDATION
4660                                                            ;OF LOCATION 0000.
4661 024756  000000                    0
4662 024760  032701  010000        6$: BIT #VLD,R1             ;TEST VALID DATA HELD IN R1
4663 024764  001020                    BNE 10$                 ;PASS; STILL A 1
4664
     024766  104000                    ERROR                           ;ERROR
                                                                        ;-----
     024770  024766                    .-2
4665                                                            ;WRITE CONTROL LOGIC TESTS
4666                                                            ;STRAP W1 IS ASSUMED IN PLACE.
4667                                                            ;READ MISS/HIT CAUSED INVALIDATION
4668                                                            ;OF LOCATION 0000.
4669 024772  000000                    0
4670 024774  000414                    BR 10$
4671 024776  032700  010000        7$: BIT #VLD,R0             ; W2 IS ASSUMED IN PLACE
4672 025002  001003                    BNE 8$                  ;PASS ;VALID DATA IS A 1
4673
     025004  104000                    ERROR                           ;ERROR
                                                                        ;-----
     025006  025004                    .-2
4674                                                            ;WRITE CONTROL LOGIC TESTS
4675                                                            ;STRAP W2 IS ASSUMED IN PLACE.
4676                                                            ;READ MISS/BYPASS CAUSED INVALIDATION
4677                                                            ;OF LOCATION 0000.
4678 025010  000000                    0
4679 025012  032701  010000        8$: BIT #VLD,R1             ;TEST VALID DATA HELD IN R1
4680 025016  001403                    BEQ 10$                 ;PASS; VALID DATA  IS A 0
4681
     025020  104000                    ERROR                           ;ERROR
                                                                        ;-----
     025022  025020                    .-2
4682                                                            ;WRITE CONTROL LOGIC TESTS
4683                                                            ;STRAP W2 IS ASSUMED IN PLACE.
4684                                                            ;READ MISS/HIT DID NOT CAUSE INVALIDATION
4685                                                            ;OF LOCATION 0000.
4686 025024  000000                    0
4687 025026  000240                10$: NOP                ;END OF TEST
4688
4689
4690
4691
4692
4693
4694 025030  005237  001464        T145:   INC $TESTN              ;UPDATE TEST ID
                                  ;;*****************************************************************
                                  .SBTTL
```

```
                                .SBTTL TEST 145
                                .SBTTL
                                .SBTTL  VERIFY THAT A WRITE HIT IN BYPASS MODE WILL INVALIDATE CACHE LOCATION
                                ;;*****************************************************************
025034  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
025036  025046                        40$                     ;TEST START LOCATION
025040  070026                        1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
025042  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
025044  070102                        25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
025046  012737  001015  177746  40$:  MOV #OFF,CCR             ;DISABLE CACHE
025054  004437  002352                JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
025060  025212                        10$+2                   ;ADDRESS OF START OF NEXT TEST

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

025062  032737  020000  177746        BIT #VSIU,CCR           ;IS SET A BEING USED?
025070  001407                        BEQ 1$                  ;YES
025072  052737  000400  177746        BIS #FC,CCR             ;NO,FLUSH CACHE FOR SET A
025100  032737  010000  177746        BIT #VCIP,CCR           ;WAIT TILL FLUSH COMPLETE
025106  001374                        BNE .-6
025110  012700  000002          1$:   MOV #2,R0               ;DATA TO R0
025114  005001                        CLR R1                  ;ADDRESS 0 TO R1

025116  012737  000015  177746        MOV #15,CCR             ;NO UCB SO AS TO ENABLE CACHE STORES
025124  112737  000002  177750        MOVB #HODO,CMR          ;HODO ALLOWS READ UPDATES,AND VALID
                                                                ;STORE DATA TO BE WRITTEN TO CMR <12>
                                                                ;ONLY DURING THE DESTINATION ACCESS
                                                                ;OF AN INSTRUCTION.
025132  005737  040000                TST 40000               ;
025136  005711                        TST (R1)                ;READ UPDATE TO CACHE LOCATION 0000.

                                                                ;WRITE 1 INTO VALID STORE LOCATION 0000.
025140  052737  001000  177746        BIS #UCB,CCR            ;BYPASS MODE
025146  010011                        MOV R0,(R1)             ;WRITE HIT BYPASS TO LOC. 0;
                                                                ;SHOULD INVALIDATE
025150  005711                        TST (R1)                ;LOAD VALID STORE LOCATION 0000 DATA
                                                                ;RESULTING FROM PREVIOUS WRITE HIT/BYPASS
                                                                ;INTO CMR<12>.
025152  013702  177750                MOV CMR,R2              ;SAVE CMR CONTENTS
025156  012737  001015  177746        MOV #OFF,CCR            ;DISABLE CACHE

025164  000240          25$:  NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
025166  000240                NOP                             ;FOR  LOOP ON ERROR

025170  105037  177750               CLRB CMR                ;DISABLE MAINTENANCE MODE
025174  032702  010000               BIT #VLD,R2             ;CHECK FOR 0
025200  001403                       BEQ 10$                 ;PASS

025202  104000                       ERROR                           ;ERROR
                                                                      ;-----
025204  025202                       .-2
                                ;WRITE CONTROL LOGIC TESTS
                                ;WRITE HIT /BYPASS DID NOT INVALIDATE
                                ;CACHE VALID STORE LOCATION
025206  000000                       0
```

```
                                10$:    NOP             ;END OF TEST


                        .SBTTL *
                        .SBTTL
                        .SBTTL *                CACHE DATA STORE RAM MEMORY MARCH PATTERN TEST
                        .SBTTL
                        .SBTTL *


T146:           INC $TESTN              ;UPDATE TEST ID
;;**************************************************************
                        .SBTTL
                        .SBTTL TEST 146
                        .SBTTL
                        .SBTTL
                        .SBTTL  VERIFY CACHE DATA STORE RAM MEMORY IC'S BY PERFORMING A
                        .SBTTL  MARCH PATTERN TEST TO LOW CACHE AREA OF DATA STORE(LOC. 0000-3777)
                        ;;;             PROCEDURE:  1. WRITE ALL 0'S TO ALL LO CACHE DATA STORE
                        ;;;                            RAMS CORRESPONDING TO LOCATIONS 0000-3777
                        ;;;                         2. READ 0'S FROM ALL LO CACHE RAMS CORRESPONDING
                        ;;;                            TO LOCATION 0000
                        ;;;                         3. WRITE ALL 1'S TO ALL RAMS CORRESPONDING TO LOCATION
                        ;;;                            0000.
                        ;;;                         4. READ 1'S FROM ALL RAMS CORRESPONDING TO LOCATION
                        ;;;                            0000.
                        ;;;                         5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
                        ;;;                            AND UNTIL LOC. 3777 IS REACHED.
                        ;;;
                        ;;**************************************************************
                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                        ;ERROR/LOOP ON TEST
                                40$                     ;TEST START LOCATION
                                1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
                                0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
                                25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
                        40$:    MOV #OFF,CCR            ;DISABLE CACHE
                                JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
                                10$+2                   ;ADDRESS OF START OF NEXT TEST

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

                        1$:     MOV #60000,R0           ;ADDRESS LOC. 60000 TO R0
                        5$:     CLR (R0)+               ;CLEAR ALL LOW CACHE MAIN MEMORY
                                CMP R0,#70000           ;DONE?
                                BNE 5$                  ;NO

                                MOV #60000,R0           ;ADDR. LOC. 60000 TO R0
                                MOV #40000,R1           ;ADDR. LOC. 40000 TO R1
                                MOV #-1,R2              ;R2 CONTAINS ALL 1'S
                                MOVB #HODO,CMR          ;HODO ALLOWS CACHE UPDATES &   DATA STORE BITS
                                                        ;TO BE WRITTEN TO CDR<15:0> ONLY DURING
                                                        ;THE DESTINATION MEMORY ACCESS OF AN
                                                        ;INSTRUCTION
                                MOV #15,CCR             ;WRITE ENABLE CACHE DATA STORES
```

```
4773
4774 025310  005721                    6$:     TST (R1)+               ;UPDATE ALL LOW CACHE
4775                                             ;DATA STORE WITH 0'S
4776 025312  005720                             TST (R0)+               ;
4777 025314  020027  070000                     CMP R0,#70000           ;DONE?
4778 025320  001373                             BNE 6$                  ;NO
4779
4780 025322  012700  060000                     MOV #60000,R0           ;ADDR. 60000 TO R0
4781 025326  005710                    7$:      TST (R0)                ;READ HIT TO CACHE DATA STORE LOCATION
4782                                             ;SPECIFIED BY R0.CLOCK DATA STORE
4783                                             ;BITS INTO CDR<15:0>.SHOULD BE ALL 0'S.
4784 025330  013705  177754                     MOV CDR,R5              ;SAVE CDR CONTENTS
4785 025334  010210                             MOV R2,(R0)             ;WRITE HIT CACUSES UPDATE TO CACHE DATA
4786                                             ;STORE LOCATION.WRITE ALL 1'S.
4787 025336  005710                             TST (R0)                ;READ HIT.CLOCK DATA STORE BITS TO
4788                                             ;CDR <15:0>.SHOULD BE ALL 1'S.
4789 025340  013703  177754                     MOV CDR,R3              ;SAVE CDR CONTENTS
4790
     025344  000240                    25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     025346  000240                             NOP                     ;FOR  LOOP ON ERROR

4791 025350  005705                             TST R5                  ;SHOULD BE ALL 0'S
4792 025352  001424                             BEQ 8$                  ;PASS
4793 025354  012737  001015  177746             MOV #OFF,CCR            ;DISABLE CACHE
4794 025362  105037  177750                     CLRB CMR                ;CLEAR MAINT. MODE
4795 025366  005037  047320                     CLR EXDAT6              ;SPECIFY EXPECTED CACHE DATA STORE DATA
4796 025372  010537  047316                     MOV R5,CDR150           ;SPECIFY CACHE DATA STORE DATA READ
4797                                             ;THRU CDR<15:0>
4798 025376  010037  047322                     MOV R0,CA121            ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
4799 025402  006237  047322                     ASR CA121
4800
     025406  104000                            ERROR                           ;ERROR
                                                                             ;-----
     025410  025406                             .-2
4801                                         ;DATA STORE MARCH PATTERN TEST
4802                                         ;READING CACHE DATA STORE DATA
4803                                         ;THRU CDR<15:0> DID NOT READ ALL 0'S.
4804                                         ;THIS SUGGESTS THAT A RAM LOCATION
4805                                         ;SPECIFIED BY CA121 WAS OVERWRITTEN
4806                                         ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
4807                                         ;LOCATION.ANY BIT IN CDR150 DATA
4808                                         ;THAT IS A 1 MAY POINT TO A BAD
4809                                         ;CACHE DATA STORE RAM.
4810
4811 025412  047320                             EXDAT6                  ; EXPECTED CACHE DATA STORE DATA
4812 025414  047316                             CDR150                  ; CACHE DATA STORE DATA READ
4813                                             ;THRU CDR<15:0>
4814 025416  047322                             CA121                   ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
4815 025420  000000                             0
4816 025422  000435                             BR 3$                   ;END THE TEST
4817 025424  022703  177777            8$:      CMP #-1,R3              ;SHOULD BE ALL 1'S
4818 025430  001425                             BEQ 9$                  ;PASS
4819 025432  012737  001015  177746             MOV #OFF,CCR            ;DISABLE CACHE
4820 025440  105037  177750                     CLRB CMR                ;CLEAR MAINT. MODE
4821 025444  012737  177777  047320             MOV #-1,EXDAT6          ;SPECIFY EXPECTED CACHE DATA STORE DATA
4822 025452  010337  047316                     MOV R3,CDR150           ;SPECIFY CACHE DATA STORE DATA READ
4823                                             ;THRU CDR<15:0>
```

```
4824 025456  010037  047322                    MOV R0,CA121          ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
4825 025462  006237  047322                    ASR CA121
4826
     025466  104000                            ERROR                       ;ERROR
                                                                          ;-----
     025470  025466                            .-2
4827                                           ;DATA STORE MARCH PATTERN TEST
4828                                           ;READING CACHE DATA STORE DATA
4829                                           ;THRU CDR<15:0> DID NOT READ ALL 1'S.
4830                                           ;ANY BIT IN CDR150 DATA
4831                                           ;THAT IS A 0 MAY POINT TO A BAD
4832                                           ;CACHE DATA STORE RAM.
4833
4834 025472  047320                            EXDAT6                ; EXPECTED CACHE DATA STORE DATA
4835 025474  047316                            CDR150                ; CACHE DATA STORE DATA READ
4836                                           ;THRU CDR<15:0>
4837 025476  047322                            CA121                 ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
4838 025500  000000                            0
4839 025502  000405                            BR 3$                 ;END TEST
4840 025504  062700  000002          9$:       ADD #2,R0             ;NEXT LOCATION
4841 025510  022700  070000                    CMP #70000,R0         ;HAS ALL LO CACHE BEEN DONE?
4842 025514  001304                            BNE 7$                ;NO,CONTINUE
4843 025516  012737  001015  177746    3$:     MOV #OFF,CCR          ;DISABLE CACHE
4844 025524  105037  177750                    CLRB CMR              ;DISABLE MAINT. MODE
4845 025530  000240                    10$:    NOP                   ;END OF TEST
4846
4847
4848
4849
4850 025532  005237  001464          T147:     INC $TESTN            ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 147
                                     .SBTTL
4851                                 .SBTTL
4852                                 .SBTTL  VERIFY CACHE DATA STORE RAM MEMORY IC'S BY PERFORMING A
4853                                 .SBTTL  MARCH PATTERN TEST TO HIGH CACHE AREA OF DATA STORE(LOC. 4000-7777)
4854                                 ;;;             PROCEDURE:  1. WRITE ALL 0'S TO ALL HI CACHE DATA STORE
4855                                 ;;;                            RAMS CORRESPONDING TO LOCATIONS 4000-7777
4856                                 ;;;                         2. READ 0'S FROM ALL HI CACHE RAMS CORRESPONDING
4857                                 ;;;                            TO LOCATION 4000
4858                                 ;;;                         3. WRITE ALL 1'S TO ALL RAMS CORRESPONDING TO LOCATION
4859                                 ;;;                            4000.
4860                                 ;;;                         4. READ 1'S FROM ALL RAMS CORRESPONDING TO LOCATION
4861                                 ;;;                            4000.
4862                                 ;;;                         5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
4863                                 ;;;                            AND UNTIL LOC. 7777 IS REACHED.
4864                                 ;;;
4865                                 ;;*****************************************************************
4866 025536  000004                            SCPCND                ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     025540  025550                            40$                   ;TEST START LOCATION
     025542  060000                            1$-40$+60000-14       ;LOOP ON ERROR START LOCATION
     025544  000000                            0                     ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     025546  060100                            25$-40$+60000-14      ;LOOP ON ERROR END LOCATION
     025550  012737  001015  177746    40$:    MOV #OFF,CCR          ;DISABLE CACHE
     025556  004437  002324                    JSR R4,RELCTL         ;LOCATE TEST CODE TO LOW CACHE SPACE
```

```
        025562  026052                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

4867    025564  012700  070000          1$:     MOV #70000,R0           ;ADDRESS LOC. 70000 TO R0
4868    025570  005020                  5$:     CLR (R0)+               ;CLEAR ALL HIGH CACHE MAIN MEMORY
4869    025572  020027  100000                  CMP R0,#100000          ;DONE?
4870    025576  001374                          BNE 5$                  ;NO
4871
4872    025600  012700  070000                  MOV #70000,R0           ;ADDR. LOC. 70000 TO R0
4873    025604  012701  050000                  MOV #50000,R1           ;ADDR. LOC. 50000 TO R1
4874    025610  012702  177777                  MOV #-1,R2              ;R2 CONTAINS ALL 1'S
4875    025614  112737  000002  177750          MOVB #HODC,CMR          ;HODO ALLOWS CACHE UPDATES &   DATA STORE BITS
4876                                            ;TO BE WRITTEN TO CDR<15:0> ONLY DURING
4877                                            ;THE DESTINATION MEMORY ACCESS OF AN
4878                                            ;INSTRUCTION
4879    025622  012737  000015  177746          MOV #15,CCR             ;WRITE ENABLE CACHE DATA STORES
4880
4881    025630  005721                  6$:     TST (R1)+               ;UPDATE ALL HIGH CACHE
4882                                            ;DATA STORE WITH 0'S
4883    025632  005720                          TST (R0)+               ;
4884    025634  020027  100000                  CMP R0,#100000          ;DONE?
4885    025640  001373                          BNE 6$                  ;NO
4886
4887    025642  012700  070000                  MOV #70000,R0           ;ADDR. 70000 TO R0
4888    025646  005710                  7$:     TST (R0)                ;READ HIT TO CACHE DATA STORE LOCATION
4889                                            ;SPECIFIED BY R0.CLOCK DATA STORE
4890                                            ;BITS INTO CDR<15:0>.SHOULD BE ALL 0'S.
4891    025650  013705  177754                  MOV CDR,R5              ;SAVE CDR CONTENTS
4892    025654  010210                          MOV R2,(R0)             ;WRITE HIT CACUSES UPDATE TO CACHE DATA
4893                                            ;STORE LOCATION.WRITE ALL 1'S.
4894    025656  005710                          TST (R0)                ;READ HIT.CHICK DATA STORE BITS TO
4895                                            ;CDR <15:0>.SHOULD BE ALL 1'S.
4896    025660  013703  177754                  MOV CDR,R3              ;SAVE CDR CONTENTS
4897
        025664  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
        025666  000240                          NOP                     ;FOR  LOOP ON ERROR

4898    025670  005705                          TST R5                  ;SHOULD BE ALL 0'S
4899    025672  001424                          BEQ 8$                  ;PASS
4900    025674  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
4901    025702  105037  177750                  CLRB CMR                ;CLEAR MAINT. MODE
4902    025706  005037  047320                  CLR EXDAT6              ;SPECIFY EXPECTED CACHE DATA STORE DATA
4903    025712  010537  047316                  MOV R5,CDR150           ;SPECIFY CACHE DATA STORE DATA READ
4904                                            ;THRU CDR<15:0>
4905    025716  010037  047322                  MOV R0,CA121            ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
4906    025722  006237  047322                  ASR CA121
4907
        025726  104000                          ERROR                           ;ERROR
                                                                                ;-----
        025730  025726                          .-2
4908                                            ;DATA STORE MARCH PATTERN TEST
4909                                            ;READING CACHE DATA STORE DATA
4910                                            ;THRU CDR<15:0> DID NOT READ ALL 0'S.
4911                                            ;THIS SUGGESTS THAT A RAM LOCATION
4912                                            ;SPECIFIED BY CA121 WAS OVERWRITTEN
```

```
4913                                                                    ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
4914                                                                    ;LOCATION.ANY BIT IN CDR150 DATA
4915                                                                    ;THAT IS A 1 MAY POINT TO A BAD
4916                                                                    ;CACHE DATA STORE RAM.
4917
4918 025732  047320                                 EXDAT6             ; EXPECTED CACHE DATA STORE DATA
4919 025734  047316                                 CDR150             ; CACHE DATA STORE DATA READ
4920                                                                    ;THRU CDR<15:0>
4921 025736  047322                                 CA121              ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
4922 025740  000000                                 0
4923 025742  000435                                 BR 3$              ;END THE TEST
4924 025744  022703  177777                 8$:     CMP #-1,R3         ;SHOULD BE ALL 1'S
4925 025750  001425                                 BEQ 9$             ;PASS
4926 025752  012737  001015  177746                 MOV #OFF,CCR       ;DISABLE CACHE
4927 025760  105037  177750                         CLRB CMR           ;CLEAR MAINT. MODE
4928 025764  012737  177777  047320                 MOV #-1,EXDAT6     ;SPECIFY EXPECTED CACHE DATA STORE DATA
4929 025772  010337  047316                         MOV R3,CDR150      ;SPECIFY CACHE DATA STORE DATA READ
4930                                                                    ;THRU CDR<15:0>
4931 025776  010037  047322                         MOV R0,CA121       ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
4932 026002  006237  047322                         ASR CA121
4933
     026006  104000                                 ERROR                      ;ERROR
                                                                                ;-----
     026010  026006                                 .-2
4934                                                                    ;DATA STORE MARCH PATTERN TEST
```

```
                                                                ;READING CACHE DATA STORE DATA
                                                                ;THRU CDR<15:0> DID NOT READ ALL 1'S.
                                                                ;ANY BIT IN CDR150 DATA
                                                                ;THAT IS A 0 MAY POINT TO A BAD
                                                                ;CACHE DATA STORE RAM.

026012  047320                          EXDAT6                 ; EXPECTED CACHE DATA STORE DATA
026014  047316                          CDR150                 ; CACHE DATA STORE DATA READ
                                                                ;THRU CDR<15:0>
026016  047322                          CA121                  ;SPECIFY FAILED DATA STORE ADDRESS LOCATION
026020  000000                          0
026022  000405                          BR 3$                  ;END TEST
026024  062700  000002          9$:     ADD #2,R0              ;NEXT LOCATION
026030  022700  100000                  CMP #100000,R0         ;HAS ALL HI CACHE BEEN DONE?
026034  001304                          BNE 7$                 ;NO,CONTINUE
026036  012737  001015  177746    3$:     MOV #OFF,CCR           ;DISABLE CACHE
026044  105037  177750                  CLRB CMR               ;DISABLE MAINT. MODE
026050  000240                  10$:    NOP                    ;END OF TEST


                        .SBTTL *
                        .SBTTL
                        .SBTTL *            CACHE TAG STORE RAM MEMORY MARCH PATTERN TEST
                        .SBTTL
                        .SBTTL *


026052  005237  001464  T150:           INC $TESTN             ;UPDATE TEST ID
                        ;;*************************************************************
                        .SBTTL
                        .SBTTL TEST 150
                        .SBTTL
                        .SBTTL
                        .SBTTL  VERIFY CACHE TAG STORE RAM MEMORY IC'S BY PERFORMING A
                        .SBTTL  MARCH PATTERN TEST TO LOW CACHE AREA OF TAG STORE(LOC. 0000-3777)
                        ;;;             PROCEDURE:  1. WRITE ALL 0'S TO ALL LO CACHE TAG STORE
                        ;;;                            RAMS CORRESPONDING TO LOCATIONS 0000-3777
                        ;;;                        2.  READ 0'S FROM ALL LO CACHE RAMS CORRESPONDING
                        ;;;                            TO LOCATION 0000
                        ;;;                        3.  WRITE ALL 1'S TO ALL RAMS CORRESPONDING TO 'OCATION
                        ;;;                            0000.
                        ;;;                        4.  READ 1'S FROM ALL RAMS CORRESPONDING TO LOCATION
                        ;;;                            0000.
                        ;;;                        5.  REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
                        ;;;                            AND UNTIL LOC. 3777 IS REACHED.
                        ;;;
                        ;;*************************************************************
026056  000004                          SCPCND                 ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                               ;ERROR/LOOP ON TEST
026060  026070                          40$                    ;TEST START LOCATION
026062  070000                          1$-40$+70000-14        ;LOOP ON ERROR START LOCATION
026064  000000                          0                      ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
026066  070070                          25$-40$+70000-14       ;LOOP ON ERROR END LOCATION
026070  012737  001015  177746    40$:    MOV #OFF,CCR           ;DISABLE CACHE
026076  004437  002352                  JSR R4,RELCTH          ;LOCATE TEST CODE TO HIGH CACHE SPACE
```

```
        026102  026446                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

 4982
 4983 026104  005037  177752            1$:     CLR CHR                 ;LOAD AMR<8:0> BY WRITING ALL 0'S TO
 4984                                           ;CHR<8:0>
 4985 026110  012700  060000                    MOV #60000,R0           ;ADDR. LOC. 60000 TO R0
 4986 026114  012701  040000                    MOV #40000,R1           ;ADDR. LOC. 40000 TO R1
 4987 026120  112737  000003  177750            MOVB #HODO+TDAR,CMR     ;HODO ALLOWS CACHE UPDATES &   TAG STORE BITS
 4988                                           ;TO BE WRITTEN TO CHR<15:7> ONLY DURING
 4989                                           ;THE DESTINATION MEMORY ACCESS OF AN
 4990                                           ;INSTRUCTION
 4991                                           ;TDAR ALLOWS TAG FIELD TO BE WRITTEN
 4992                                           ;INTO FROM AMR<8:0>
 4993 026126  012737  000015  177746            MOV #15,CCR             ;WRITE ENABLE CACHE TAG STORES
 4994
 4995 026134  005721                    6$:     TST (R1)+               ;WRITE ALL LOW CACHE
 4996                                           ;TAG STORE WITH 0'S
 4997 026136  005720                            TST (R0)+               ;
 4998 026140  020027  070000                    CMP R0,#70000           ;DONE?
 4999 026144  001373                            BNE 6$                  ;NO
 5000
 5001 026146  012737  177777  177752            MOV #-1,CHR             ;LOAD AMR<8:0> BY WRITING TO CHR<8:0>
 5002 026154  012700  060000                    MOV #60000,R0           ;ADDR. 60000 TO R0
 5003 026160  005710                    7$:     TST (R0)                ;READ MISS TO CACHE TAG STORE LOCATION
 5004                                           ;SPECIFIED BY R0.CLOCK TAG STORE
 5005                                           ;BITS INTO CHR<15:7>.SHOULD BE ALL 0'S.
 5006                                           ;ALSO CAUSES TAG STORE LOCATION TO BE
 5007                                           ;WRITTEN WITH 1'S FROM AMR<8:0>
 5008 026162  013705  177752                    MOV CHR,R5              ;SAVE CHR CONTENTS
 5009 026166  005710                            TST (R0)                ;READ MISS.CLOCK TAG STORE BITS TO
 5010                                           ;CHR <15:0>.SHOULD BE ALL 1'S.
 5011 026170  013703  177752                    MOV CHR,R3              ;SAVE CHR CONTENTS
 5012
      026174  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      026176  000240                            NOP                     ;FOR  LOOP ON ERROR

 5013 026200  042705  000177                    BIC #177,R5
 5014 026204  005705                            TST R5                  ;SHOULD BE ALL 0'S
 5015 026206  001437                            BEQ 8$                  ;PASS
 5016 026210  012737  001015  177746            MOV #OFF,CCR            ;DISABLE CACHE
 5017 026216  105037  177750                    CLRB CMR                ;CLEAR MAINT. MODE
 5018 026222  005037  047336                    CLR EXDAT3              ;SPECIFY EXPECTED CACHE TAG STORE DATA
 5019 026226  010537  047310                    MOV R5,CHR157           ;SPECIFY CACHE TAG STORE TAG READ
 5020                                           ;THRU CHR<15:7>
 5021 026232  012737  000007  002052            MOV #7,LOOP             ;PREPARE CHR157 FOR TYPEOUT
 5022 026240  006237  047310            4$:     ASR CHR157
 5023 026244  042737  100000  047310            BIC #100000,CHR157
 5024 026252  005337  002052                    DEC LOOP
 5025 026256  001370                            BNE 4$
 5026
 5027 026260  010037  047322                    MOV R0,CA121            ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
 5028 026264  006237  047322                    ASR CA121
 5029
      026270  104000                            ERROR                           ;ERROR
```

```
                                                                ;-----
     026272  026270                                    .-2
5030                                                            ;TAG STORE MARCH PATTERN TEST
5031                                                            ;READING CACHE TAG STORE DATA
5032                                                            ;THRU CHR<15:7> DID NOT READ ALL 0'S.
5033                                                            ;THIS SUGGESTS THAT A RAM LOCATION
5034                                                            ;SPECIFIED BY CA121 WAS OVERWRITTEN
5035                                                            ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
5036                                                            ;LOCATION.ANY BIT IN CHR157 DATA
5037                                                            ;THAT IS A 1 MAY POINT TO A BAD
5038                                                            ;CACHE TAG STORE RAM.
5039
5040 026274  047336                                    EXDAT3  ; EXPECTED CACHE TAG STORE DATA
5041 026276  047310                                    CHR157  ; CACHE TAG STORE DATA READ
5042                                                            ;THRU CHR<15:7>
5043 026300  047322                                    CA121   ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
5044 026302  000000                                    0
5045 026304  000452                                    BR 3$   ;END THE TEST
5046 026306  042703  000177                       8$:  BIC #177,R3  ;PREPARE R3 FOR CHECK
5047
5048 026312  022703  177600                            CMP #177600,R3  ;SHOULD BE ALL 1'S
5049 026316  001440                                    BEQ 9$  ;PASS
5050 026320  012737  001015  177746                    MOV #OFF,CCR  ;DISABLE CACHE
5051 026326  105037  177750                            CLRB CMR  ;CLEAR MAINT. MODE
5052 026332  012737  177777  047336                    MOV #-1,EXDAT3  ;SPECIFY EXPECTED CACHE TAG STORE DATA
5053 026340  010337  047310                            MOV R3,CHR157  ;SPECIFY CACHE TAG STORE DATA READ
5054                                                            ;THRU CHR<15:7>
5055 026344  012737  000007  002052                    MOV #7,LOOP  ;PREPARE CHR157 FOR TYPEOUT
5056 026352  006237  047310                       5$:  ASR CHR157
5057 026356  042737  100000  047310                    BIC #100000,CHR157
5058 026364  005337  002052                            DEC LOOP
5059 026370  001370                                    BNE 5$
5060
5061 026372  010037  047322                            MOV R0,CA121  ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
5062 026376  006237  047322                            ASR CA121
5063                                                                    .
     026402  104000                                    ERROR                   ;ERROR
                                                                                ;-----
     026404  026402                                    .-2
5064                                                            ;TAG STORE MARCH PATTERN TEST
5065                                                            ;READING CACHE TAG STORE DATA
5066                                                            ;THRU CHR<15:7> DID NOT READ ALL 15'S.
5067                                                            ;ANY BIT IN CHR157 DATA
5068                                                            ;THAT IS A 0 MAY POINT TO A BAD
5069                                                            ;CACHE TAG STORE RAM.
5070
5071 026406  047336                                    EXDAT3  ; EXPECTED CACHE TAG STORE DATA
5072                                                            ; CACHE TAG STORE DATA READ
5073                                                            ;THRU CHR<15:7>
5074 026410  047310                                    CHR157  ;CACHE TAG STORE READ THRU CHR<15:7>
5075 026412  047322                                    CA121   ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
5076 026414  000000                                    0
5077 026416  000405                                    BR 3$   ;END TEST
5078 026420  062700  000002                       9$:  ADD #2,R0  ;NEXT LOCATION
5079 026424  022700  070000                            CMP #70000,R0  ;HAS ALL LO CACHE BEEN DONE?
5080 026430  001253                                    BNE 7$  ;NO,CONTINUE
5081 026432  012737  001015  177746               3$:  MOV #OFF,CCR  ;DISABLE CACHE
```

```
5082 026440  105037  177750                    CLRB CMR                ;DISABLE MAINT. MODE
5083 026444  000240                      10$:   NOP                     ;END OF TEST
5084
5085
5086
5087
5088
5089
5090 026446  005237  001464              T151:  INC $TESTN              ;UPDATE TEST ID
                                          ;;*****************************************************************
                                          .SBTTL
                                          .SBTTL TEST 151
                                          .SBTTL
5091                                      .SBTTL
5092                                      .SBTTL  VERIFY CACHE TAG STORE RAM MEMORY IC'S BY PERFORMING A
5093                                      .SBTTL  MARCH PATTERN TEST TO HIGH CACHE AREA OF TAG STORE(LOC. 4000-7777)
5094                                      ;;;             PROCEDURE:  1. WRITE ALL 0'S TO ALL HI CACHE TAG STORE
5095                                      ;;;                            RAMS CORRESPONDING TO LOCATIONS 4000-7777
5096                                      ;;;                        2.  READ 0'S FROM ALL HI CACHE RAMS CORRESPONDING
5097                                      ;;;                            TO LOCATION 4000
5098                                      ;;;                        3.  WRITE ALL 1'S TO ALL RAMS CORRESPONDING TO LOCATION
5099                                      ;;;                            4000.
5100                                      ;;;                        4.  READ 1'S FROM ALL RAMS CORRESPONDING TO LOCATION
5101                                      ;;;                            4000.
5102                                      ;;;                        5.  REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
5103                                      ;;;                            AND UNTIL LOC. 7777 IS REACHED.
5104                                      ;;;
5105                                      ;;*****************************************************************
5106 026452  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      026454  026464                            40$                     ;TEST START LOCATION
      026456  060000                            1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
      026460  000000                            0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      026462  060070                            25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
      026464  012737  001015  177746      40$:  MOV #OFF,CCR            ;DISABLE CACHE
      026472  004437  002324                    JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
      026476  027042                            10$+2                   ;ADDRESS OF START OF NEXT TEST

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

5107
5108 026500  005037  177752              1$:   CLR CHR                 ;LOAD AMR<8:0> BY WRITING ALL 0'S TO
5109                                                                    ;CHR<8:0>
5110 026504  012700  070000                    MOV #70000,R0           ;ADDR. LOC. 70000 TO R0
5111 026510  012701  050000                    MOV #50000,R1           ;ADDR. LOC. 50000 TO R1
5112 026514  112737  000003  177750            MOVB #HODO+TDAR,CMR     ;HODO ALLOWS CACHE UPDATES &   TAG STORE BITS
5113                                                                    ;TO BE WRITTEN TO CHR<15:7> ONLY DURING
5114                                                                    ;THE DESTINATION MEMORY ACCESS OF AN
5115                                                                    ;INSTRUCTION
5116                                                                    ;TDAR ALLOWS TAG FIELD TO BE WRITTEN
5117                                                                    ;INTO FROM AMR<8:0>
5118 026522  012737  000015  177746            MOV #15,CCR             ;WRITE ENABLE CACHE TAG STORES
5119
5120 026530  005721                      6$:   TST (R1)+               ;WRITE ALL HIGH CACHE
5121                                                                    ;TAG STORE WITH 0'S
5122 026532  005720                            TST (R0)+               ;
```

```
5123 026534  020027  100000                    CMP R0,#100000          ;DONE?
5124 026540  001373                            BNE 6$                  ;NO
5125
5126 026542  012737  177777  177752            MOV #-1,CHR             ;LOAD AMR<8:0> BY WRITING TO CHR<8:0>
5127 026550  012700  070000                    MOV #70000,R0           ;ADDR. 70000 TO R0
5128 026554  005710                      7$:   TST (R0)                ;READ MISS TO CACHE TAG STORE LOCATION
5129                                           ;SPECIFIED BY R0.CLOCK TAG STORE
5130                                           ;BITS INTO CHR<15:7>.SHOULD BE ALL 0'S.
5131                                           ;ALSO CAUSES TAG STORE LOCATION TO BE
5132                                           ;WRITTEN WITH 1'S FROM AMR<8:0>
5133 026556  013705  177752                    MOV CHR,R5              ;SAVE CHR CONTENTS
5134 026562  005710                            TST (R0)                ;READ MISS.CLOCK TAG STORE BITS TO
5135                                           ;CHR <15:7>.SHOULD BE ALL 1'S.
5136 026564  013703  177752                    MOV CHR,R3              ;SAVE CHR CONTENTS
5137
     026570  000240                      25$:  NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     026572  000240                            NOP                     ;FOR  LOOP ON ERROR

5138 026574  042705  000177                    BIC #177,R5
5139 026600  005705                            TST R5                  ;SHOULD BE ALL 0'S
5140 026602  001437                            BEQ 8$                  ;PASS
5141 026604  012737  001015  177746            MOV #OFF,CCR            ;DISABLE CACHE
5142 026612  105037  177750                    CLRB CMR                ;CLEAR MAINT. MODE
5143 026616  005037  047336                    CLR EXDAT3              ;SPECIFY EXPECTED CACHE TAG STORE DATA
5144 026622  010537  047310                    MOV R5,CHR157           ;SPECIFY CACHE TAG STORE TAG READ
5145                                           ;THRU CHR<15:7>
5146 026626  012737  000007  002052            MOV #7,LOOP             ;PREPARE CHR157 FOR TYPEOUT
5147 026634  006237  047310              4$:   ASR CHR157
5148 026640  042737  100000  047310            BIC #100000,CHR157
5149 026646  005337  002052                    DEC LOOP
5150 026652  001370                            BNE 4$
5151
5152 026654  010037  047322                    MOV R0,CA121            ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
5153 026660  006237  047322                    ASR CA121
5154
     026664  104000                            ERROR                           ;ERROR
                                                                                ;-----
     026666  026664                            .-2
5155                                           ;TAG STORE MARCH PATTERN TEST
5156                                           ;READING CACHE TAG STORE DATA
5157                                           ;THRU CHR<15:7> DID NOT READ ALL 0'S.
5158                                           ;THIS SUGGESTS THAT A RAM LOCATION
5159                                           ;SPECIFIED BY CA121 WAS OVERWRITTEN
5160                                           ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
5161                                           ;LOCATION.ANY BIT IN CHR157 DATA
5162                                           ;THAT IS A 1 MAY POINT TO A BAD
5163                                           ;CACHE TAG STORE RAM.
5164
5165 026670  047336                            EXDAT3                  ; EXPECTED CACHE TAG STORE DATA
5166 026672  047310                            CHR157                  ; CACHE TAG STORE DATA READ
5167                                           ;THRU CHR<15:7>
5168 026674  047322                            CA121                   ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
5169 026676  000000                            0
5170 026700  000452                            BR 3$                   ;END THE TEST
5171 026702  042703  000177              8$:   BIC #177,R3             ;PREPARE R3 FOR CHECK
5172
5173 026706  022703  177600                    CMP #177600,R3          ;SHOULD BE ALL 1'S
```

```
5174 026712  001440                          BEQ 9$                  ;PASS
5175 026714  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
5176 026722  105037  177750                  CLRB CMR                ;CLEAR MAINT. MODE
5177 026726  012737  177777  047336          MOV #-1,EXDAT3          ;SPECIFY EXPECTED CACHE TAG STORE DATA
5178 026734  010337  047310                  MOV R3,CHR157           ;SPECIFY CACHE TAG STORE DATA READ
5179                                                                 ;THRU CHR<15:7>
5180 026740  012737  000007  002052          MOV #7,LOOP             ;PREPARE CHR157 FOR TYPEOUT
5181 026746  006237  047310          5$:     ASR CHR157
5182 026752  042737  100000  047310          BIC #100000,CHR157
5183 026760  005337  002052                  DEC LOOP
5184 026764  001370                          BNE 5$
5185
5186 026766  010037  047322                  MOV R0,CA121            ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
5187 026772  006237  047322                  ASR CA121
5188
     026776  104000                          ERROR                           ;ERROR
                                                                             ;-----
     027000  026776                          .-2
5189                                                                 ;TAG STORE MARCH PATTERN TEST
5190                                                                 ;READING CACHE TAG STORE DATA
5191                                                                 ;THRU CHR<15:7> DID NOT READ ALL 15'S.
5192                                                                 ;ANY BIT IN CHR157 DATA
5193                                                                 ;THAT IS A 0 MAY POINT TO A BAD
5194                                                                 ;CACHE TAG STORE RAM.
5195
5196 027002  047336                          EXDAT3                  ; EXPECTED CACHE TAG STORE DATA
5197                                                                 ; CACHE TAG STORE DATA READ
5198                                                                 ;THRU CHR<15:7>
5199 027004  047310                          CHR157                  ;CACHE TAG STORE READ THRU CHR<15:7>
5200 027006  047322                          CA121                   ;SPECIFY FAILED TAG STORE ADDRESS LOCATION
5201 027010  000000                          0
5202 027012  000405                          BR 3$                   ;END TEST
5203 027014  062700  000002          9$:     ADD #2,R0               ;NEXT LOCATION
5204 027020  022700  100000                  CMP #100000,R0          ;HAS ALL HI CACHE BEEN DONE?
5205 027024  001253                          BNE 7$                  ;NO,CONTINUE
5206 027026  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
5207 027034  105037  177750                  CLRB CMR                ;DISABLE MAINT. MODE
5208 027040  000240                  10$:    NOP                     ;END OF TEST
5209
5210
5211
5212
5213
5214
5215                                  .SBTTL *
5216                                  .SBTTL
5217                                  .SBTTL *        DATA PARITY/TAG PARITY GENERATION AND STORAGE TESTS
5218                                  .SBTTL          ----------------------------------------------------
5219                                  .SBTTL
5220                                  .SBTTL *
5221
5222
5223
5224
5225 027042  005237  001464          T152:           INC $TESTN              ;UPDATE TEST ID
                                      ;;**************************************************************
                                      .SBTTL
```

```
                                .SBTTL TEST 152
                                .SBTTL
                                .SBTTL  VERIFY THAT LOW AND HI BYTE DATA PARITY STORES CAN HOLD A 0 AT DATA
                                .SBTTL  PARITY STORE LOCATION 0000.
                                .SBTTL
                                ;;;             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
                                ;;;
                                ;;**************************************************************************
5244 027046  000004                     SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
     027050  027060                     40$                     ;TEST START LOCATION
     027052  070004                     1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     027054  000000                     0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     027056  070040                     25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     027060  012737  001015  177746  40$:  MOV #OFF,CCR          ;DISABLE CACHE
     027066  004437  002352               JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     027072  027204                     10$+2                   ;ADDRESS OF START OF NEXT TEST

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

5245 027074  005037  060000               CLR 60000               ;0'S TO MAIN MEMORY LOCATION
5246 027100  112737  000002  177750  1$:  MOVB #HODO,CMR           ;ALLOWS UPPER AND LOWER BYTE DATA
5247                                                            ;PARITY STORE BITS TO BE WRITTEN TO
5248                                                            ;CMR<11:10> ONLY DURING THE  DESTINATION
5249                                                            ;ACCESS OF AN INSTRUCTION.
5250 027106  012737  000015  177746       MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE PARITY
5251                                                            ;STORE
5252 027114  005737  040000               TST 40000               ;
5253 027120  005737  060000               TST 60000               ;PLACE ALL 0'S ON WRTD<15:0> INPUTS
5254                                                            ;THEREBY WRITING 0 INTO PARITY STORE LOCATION 0000.
5255 027124  005737  060000               TST 60000               ;WRITE UPPER AND LOWER DATA PARITY BITS FROM
5256                                                            ;LOCAT. 0000 INTO CMR<11:10> RESPECTIVELY.
5257 027130  013701  177750               MOV CMR,R1              ;SAVE CMR DATA
5258
     027134  000240                  25$:  NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     027136  000240                        NOP                     ;FOR  LOOP ON ERROR

5259 027140  105037  177750               CLRB CMR                ;DISABLE MAINT. MODE
5260 027144  012737  001015  177746       MOV #OFF,CCR            ;DISABLE CACHE
5261 027152  032701  004000               BIT #HPB,R1             ;CHECK FOR 0
5262 027156  001403                       BEQ 9$                  ;PASS
5263
     027160  104000                       ERROR                           ;ERROR
                                                                        ;-----
```

```
                027162  027160                          .-2
5264                                                    ;DATA PARITY GEN. & STORE TESTS
5265                                                    ;READING CACHE MAINT. REGISTER
5266                                                    ;BIT 11 FOR UPPER BYTE PARITY DATA DID
5267                                                    ;NOT RESULT IN 0.
5268 027164  000000                          0
5269                                    ;;;
5270 027166  032701  002000              9$:   BIT #LPB,R1                 ;CHECK 0 FOR LOWER BYTE PARITY DATA
5271 027172  001403                          BEQ 10$                      ;PASS
5272
                027174  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                027176  027174                          .-2
5273                                                    ;DAT. PARITY GEN. $ STORE TESTS
5274                                                    ;READING CACHE MAINT. REGISTER
5275                                                    ;BIT 10 FOR LOWER BYTE PARITY DATA DID
5276                                                    ;NOT RESULT IN 0.
5277 027200  000000                          0
5278 027202  000240                    10$:   NOP                  ;END OF TEST
5279
5280
5281 027204  005237  001464          T153:             INC $TESTN                  ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 153
                                    .SBTTL
5282                                .SBTTL  VERIFY THAT THE LOW BYTE DATA PARITY GENERATOR WILL WRITE A 1 INTO  ADDRESS LOCATION
5283                                .SBTTL  FOR FLOATING 1 ACROSS 0 DATA PATTERN ON DATA PARITY GENERATOR INPUTS.
5284                                .SBTTL
5285                                ;;;             PROCEDURE: FOR EACH FLOATING 1 PATTERN READ DATA PARITY STORE BITS
5286                                ;;;                        FROM CMR<11:10>
5287                                ;;;
5288                                ;;;             CONDITIONS:
5289                                ;;;                     INPUTS TO DATA PARITY GEN.:
5290                                ;;;                          WRTD<7:0> FLOATING 1 ACROSS 0'S
5291                                ;;;                          WRTD<15:8> ALL 0'S
5292                                ;;;                          WWPD(1)=0
5293                                ;;;                       DATA PARITY STORE ADDRESS:
5294                                ;;;                         CA<12:1>=0000
5295                                ;;;
5296                                ;;;             RESULT: CMR<11>=0
5297                                ;;;                     CMR<10>=1
5298                                ;;;
5299                                ;;*****************************************************************
5300 027210  000004                          SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                            ;ERROR/LOOP ON TEST
                027212  027222                          40$                             ;TEST START LOCATION
                027214  070014                          1$-40$+70000-14                 ;LOOP ON ERROR START LOCATION
                027216  000000                          0                               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
                027220  070050                          25$-40$+70000-14                ;LOOP ON ERROR END LOCATION
                027222  012737  001015  177746    40$:   MOV #OFF,CCR                    ;DISABLE CACHE
                027230  004437  002352                  JSR R4,RELCTH                   ;LOCATE TEST CODE TO HIGH CACHE SPACE
                027234  027376                          10$+2                           ;ADDRESS OF START OF NEXT TEST

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

```
5301 027236  012737  000001  047332          MOV #1,FLTPAT          ;1ST FLOATING 1 PATTERN:000001
5302 027244  013737  047332  060000    2$:   MOV FLTPAT,60000       ;FLOATING PATTERN TO MAIN MEMORY
5303 027252  112737  000002  177750    1$:   MOVB #HODO,CMR         ;ALLOWS UPPER AND LOWER BYTE DATA
5304                                           ;PARITY STORE BITS TO BE WRITTEN TO
5305                                           ;CMR<11:10> ONLY DURING THE  DESTINATION
5306                                           ;ACCESS OF AN INSTRUCTION.
5307 027260  012737  000015  177746          MOV #15,CCR            ;NO UCB SO AS TO WRITE ENABLE PARITY
5308                                           ;STORE
5309 027266  005737  040000                  TST 40000              ;
5310 027272  005737  060000                  TST 60000              ;PLACE FLOATING 1 PATTERN ON WRTD<15:0> INPUTS
5311                                           ;THEREBY WRITING  1 IN LOW BYTE AND 0 IN HI
5312                                           ;BYTE DATA PARITY STORE LOCATION 0000.
5313 027276  005737  060000                  TST 60000              ;WRITE UPPER AND LOWER BYTE DATA PARITY BITS FROM
5314                                           ;LOCAT. 0000 INTO CMR<11:10> RESPECTIVELY.
5315 027302  013701  177750                  MOV CMR,R1             ;SAVE CMR DATA
5316
     027306  000240              25$:   NOP                          ;INSTRUCTION 'JMP 1$' PLACED HERE
     027310  000240                     NOP                          ;FOR  LOOP ON ERROR

5317 027312  105037  177750                  CLRB CMR               ;DISABLE MAINT. MODE
5318 027316  012737  001015  177746          MOV #OFF,CCR           ;DISABLE CACHE
5319 027324  032701  004000                  BIT #HPB,R1            ;CHECK  0 FOR UPPER BYTE PARITY STORE
5320 027330  001404                          BEQ 8$                 ;PASS
5321
     027332  104000                         ERROR                          ;ERROR
                                                                            ;-----
     027334  027332                         .-2
5322                                           ;DATA PARITY GEN. & STORE TESTS
5323                                           ;READING CACHE MAINT. REGISTER
5324                                           ;BIT 11 FOR UPPER BYTE PARITY DATA DID
5325                                           ;NOT RESULT IN 0.
5326 027336  047332                         FLTPAT                 ;PRINT FLOATING 1 PATTERN USED FOR DATA PARITY
5327                                           ;GENERATOR INPUTS: WRTD<15:0>
5328 027340  000000                         0
5329                              ;;;
5330 027342  032701  002000          8$:    BIT #LPB,R1            ;CHECK 1 FOR LOWER BYTE PARITY DATA
5331 027346  001004                         BNE 9$                 ;PASS
5332
     027350  104000                         ERROR                          ;ERROR
                                                                            ;-----
     027352  027350                         .-2
5333                                           ;DAT. PARITY GEN. $ STORE TESTS
5334                                           ;READING CACHE MAINT. REGISTER
5335                                           ;BIT 10 FOR LOWER BYTE PARITY DATA DID
5336                                           ;NOT RESULT IN 1.
5337 027354  047332                         FLTPAT                 ;PRINT FLOATING 1 PATTERN USED FOR DATA PARITY
5338                                           ;GEN. INPUT: WRTD<15:0>
5339 027356  000000                         0
5340                              ;;;
5341 027360  006337  047332          9$:    ASL FLTPAT             ;NEXT PATTREN
5342 027364  032737  000400  047332          BIT #400,FLTPAT        ;HAS PATTERN 000200 BEEN DONE
5343 027372  001724                         BEQ 2$                 ;NO
5344 027374  000240                 10$:    NOP             ;END OF TEST
5345
5346
5347 027376  005237  001464          T154:  INC $TESTN              ;UPDATE TEST ID
                                   ;;*****************************************************************
```

```
                                .SBTTL
                                .SBTTL TEST 154
                                .SBTTL
                                .SBTTL  VERIFY THAT THE HI BYTE DATA PARITY GENERATOR WILL WRITE A 1 INTO  ADDRESS LOCATION
                                .SBTTL  FOR FLOATING 1 ACROSS 0 DATA PATTERN ON DATA PARITY GENERATOR INPUTS.
                                .SBTTL
                                ;;;             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
                                ;;;
                                ;;;*****************************************************************
5366 027402  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     027404  027414                             40$                     ;TEST START LOCATION
     027406  070014                             1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     027410  000000                             0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     027412  070050                             25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     027414  012737  001015  177746      40$:   MOV #OFF,CCR            ;DISABLE CACHE
     027422  004437  002352                     JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     027426  027562                             10$+2                   ;ADDRESS OF START OF NEXT TEST

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

5367 027430  012737  000400  047332             MOV #400,FLTPAT         ;1ST FLOATING 1 PATTERN:000400
5368 027436  013737  047332  060000     2$:     MOV FLTPAT,60000        ;FLOATING PATTERN TO MAIN MEMORY
5369 027444  112737  000002  177750     1$:             MOVB #HODO,CMR          ;ALLOWS UPPER AND LOWER BYTE DATA
                                                                        ;PARITY STORE BITS TO BE WRITTEN TO
                                                                        ;CMR<11:10> ONLY DURING THE  DESTINATION
                                                                        ;ACCESS OF AN INSTRUCTION.
5373 027452  012737  000015  177746             MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE PARITY
                                                                        ;STORE
5375 027460  005737  040000                     TST 40000               ;
5376 027464  005737  060000                     TST 60000               ;PLACE FLOATING 1 PATTERN ON WRTD<15:0> INPUTS
                                                                        ;THEREBY WRITING  0 IN LOW BYTE AND 1 IN HI
                                                                        ;BYTE DATA PARITY STORE LOCATION 0000.
5379 027470  005737  060000                     TST 60000               ;WRITE UPPER AND LOWER BYTE DATA PARITY BITS FROM
                                                                        ;LOCAT. 0000 INTO CMR<11:10> RESPECTIVELY.
5381 027474  013701  177750                     MOV CMR,R1              ;SAVE CMR DATA

     027500  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     027502  000240                            NOP                     ;FOR  LOOP ON ERROR

5383 027504  105037  177750                     CLRB CMR                ;DISABLE MAINT. MODE
5384 027510  012737  001015  177746             MOV #OFF,CCR            ;DISABLE CACHE
5385 027516  032701  004000                     BIT #1,PB,R1            ;CHECK  1 FOR UPPER BYTE PARITY STORE
5386 027522  001004                             BNE 8$                  ;PASS
```

```
5387
5388
     027524  104000                          ERROR                   ;ERROR
                                                                     ;-----
     027526  027524                          .-2
5389                                                                 ;DATA PARITY GEN. & STORE TESTS
5390                                                                 ;READING CACHE MAINT. REGISTER
5391                                                                 ;BIT 11 FOR UPPER BYTE PARITY DATA DID
5392                                                                 ;NOT RESULT IN 1.
5393 027530  047332                          FLTPAT                  ;PRINT FLOATING 1 PATTERN USED FOR DATA PARITY
5394                                                                 ;GENERATOR INPUTS: WRTD<15:0>
5395 027532  000000                          0
5396                                ;;;
5397 027534  032701  002000          8$:     BIT #LPB,R1             ;CHECK 0 FOR LOWER BYTE PARITY DATA
5398 027540  001404                          BEQ 9$                  ;PASS
5399
5400
     027542  104000                          ERROR                   ;ERROR
                                                                     ;-----
     027544  027542                          .-2
5401                                                                 ;DAT. PARITY GEN. $ STORE TESTS
5402                                                                 ;READING CACHE MAINT. REGISTER
5403                                                                 ;BIT 10 FOR LOWER BYTE PARITY DATA DID
5404                                                                 ;NOT RESULT IN 0.
5405 027546  047332                          FLTPAT                  ;PRINT FLOATING 1 PATTERN USED FOR DATA PARITY
5406                                                                 ;GEN. INPUTS: WRTD<15:0>
5407 027550  000000                          0
5408                                ;;;
5409 027552  006337  047332          9$:     ASL FLTPAT              ;NEXT PATTERN
5410 027556  103327                          BCC 2$                  ;CONTINUE IF PATTERN 100000 NOT DONE
5411 027560  000240                  10$:    NOP             ;END OF TEST
5412
5413
5414 027562  005237  001464          T155:   INC $TESTN              ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 155
                                    .SBTTL
5415                                .SBTTL  VERIFY  WRITE WRONG PARITY TO UPPER AND LOWER BYTE DATA PARITY
5416                                .SBTTL  STORE .
5417                                .SBTTL
5418                                ;;;             CONDITIONS:
5419                                ;;;                     INPUTS TO DATA PARITY GEN:
5420                                ;;;                         WRTD<15:0> ALL 0'S
5421                                ;;;                         WWPD(1)= 1
5422                                ;;;                     DATA PARITY STORE ADDRESS:
5423                                ;;;                      CA<12:1>=0000
5424                                ;;;
5425                                ;;;             RESULT:     CMR<11:10> BOTH 1
5426                                ;;;
5427                                ;;*****************************************************************
5428 027566  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     027570  027600                          40$                     ;TEST START LOCATION
     027572  070004                          1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     027574  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     027576  070040                          25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
```

```
                027600  012737  001015  177746          40$:    MOV #OFF,CCR            ;DISABLE CACHE
                027606  004437  002352                          JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
                027612  027742                                  10$+2                   ;ADDRESS OF START OF NEXT TEST

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

 5429           027614  005037  060000                          CLR 60000               ;0'S TO MAIN MEMORY LOCATION
 5430           027620  112737  000002  177750          1$:     MOVB #HODO,CMR          ;ALLOWS UPPER AND LOWER BYTE DATA
 5431                                                           ;PARITY STORE BITS TO BE WRITTEN TO
 5432                                                           ;CMR<11:10> ONLY DURING THE  DESTINATION
 5433                                                           ;ACCESS OF AN INSTRUCTION.
 5434           027626  012737  000115  177746                  MOV #15+WWPD,CCR        ;NO UCB SO AS TO WRITE ENABLE PARITY.
 5435                                                           ;ENABLE WRITE WRONG PARITY DATA
 5436           027634  005737  040000                          TST 40000               ;
 5437           027640  005737  060000                          TST 60000               ;PLACE ALL 0'S ON WRTD<15:0> INPUTS
 5438                                                           ;SINCE WWPD IS INVOKED A 1 WILL BE
 5439                                                           ;WRITTEN INTO PARITY STORE LOCATION 0000.
 5440           027644  005737  060000                          TST 60000               ;WRITE UPPER AND LOWER DATA PARITY BITS FROM
 5441                                                           ;LOCAT. 0000 INTO CMR<11:10> RESPECTIVELY.
 5442           027650  013701  177750                  MOV CMR,R1              ;SAVE CMR DATA
 5443
                027654  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
                027656  000240                          NOP                     ;FOR  LOOP ON ERROR

 5444           027660  012737  001015  177746                  MOV #OFF,CCR            ;DISABLE CACHE
 5445           027666  105037  177750                  CLRB CMR                ;DISABLE MAINT. MODE
 5446           027672  052737  000400  177746                  BIS #FC,CCR             ;BEFORE LEAVING TEST FLUSH CACHE TO
 5447                                                           ;REMOVE ANY EFFECTS OF WWPD
 5448           027700  032737  010000  177746                  BIT #VCIP,CCR           ;WAIT TILL DONE
 5449           027706  001374                          BNE .-6
 5450           027710  032701  004000                  BIT #HPB,R1             ;CHECK 1 FOR UPPER BYTE PARITY STORE.
 5451           027714  001003                          BNE 9$                  ;PASS
 5452
 5453
                027716  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                027720  027716                          .-2
 5454                                                           ;DATA PARITY GEN. & STORE TESTS
 5455                                                           ;READING CACHE MAINT. REGISTER
 5456                                                           ;BIT 11 FOR UPPER BYTE PARITY DATA DID
 5457                                                           ;NOT RESULT IN 1.
 5458           027722  000000                          0
 5459                                   ;;;
 5460           027724  032701  002000          9$:     BIT #LPB,R1             ;CHECK 1 FOR LOWER BYTE PARITY DATA
 5461           027730  001003                          BNE 10$                 ;PASS
 5462
 5463
                027732  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                027734  027732                          .-2
 5464                                                           ;DAT. PARITY GEN. $ STORE TESTS
 5465                                                           ;READING CACHE MAINT. REGISTER
 5466                                                           ;BIT 10 FOR LOWER BYTE PARITY DATA DID
 5467                                                           ;NOT RESULT IN 1.
 5468           027736  000000                          0
 5469           027740  000240                  10$:    NOP             ;END OF TEST
```

```
                                T156:           INC $TESTN              ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 156
                                .SBTTL
                                .SBTTL  VERIFY THAT TAG  PARITY STORE CAN HOLD A 0 AT TAG
                                .SBTTL  PARITY STORE LOCATION 0000.
                                .SBTTL
                                ;;;             PROCEDURE: GENERATE 0 FROM TAG   PARITY
                                ;;;                         GENERATOR BY PLACING ALL 0'S ON INPUTS.
                                ;;;                         ZERO WILL BE WRITTEN  INTO TAG PARITY STORE
                                ;;;                        LOCATION 0000.READ TAG PARITY STORE BIT FROM
                                ;;;                        CMR<9>
                                ;;;
                                ;;;             CONDITIONS:INPUTS TO TAG PARITY GEN:
                                ;;;                         TAG WRTD<21:13> ALL 0'S
                                ;;;                         WWPT(1)= 0
                                ;;;                        TAG PARITY STORE ADDRESS:
                                ;;;                         CA<12:1>=0000
                                ;;;
                                ;;;             RESULT:     CMR<9>=  0
                                ;;;
                                ;;*****************************************************************
027746  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
027750  027760                          40$                     ;TEST START LOCATION
027752  070004                          1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
027754  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
027756  070040                          25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
027760  012737  001015  177746    40$:  MOV #OFF,CCR            ;DISABLE CACHE
027766  004437  002352                  JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
027772  030070                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

027774  005037  177752                  CLR CHR                 ;LOAD AMR<8:0> BY WRITING ALL 0'S TO CHR<8:0>
030000  112737  000003  177750    1$:   MOVB #HODO+TDAR,CMR     ; HODO ALLOWS TAG
                                                                ;PARITY STORE BIT TO BE WRITTEN TO
                                                                ;CMR<9> ONLY DURING THE  DESTINATION
                                                                ;ACCESS OF AN INSTRUCTION.
                                                                ;TDAR ALLOWS INPUTS TO TAG PARITY STORE
                                                                ;GENERATOR TO BE LOADED FROM AMR<8:0>
030006  012737  000015  177746          MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE PARITY
                                                                ;STORE
030014  005737  040000                  TST 40000               ;
030020  005737  060000                  TST 60000               ;PLACE ALL 0'S ON TAG  WRTD<21:13> INPUTS
                                                                ;THEREBY WRITING 0 INTO PARITY STORE LOCATION 0000.
030024  005737  060000                  TST 60000               ;WRITE TAG PARITY BITS FROM
```

```
5511
5512 030030  013701  177750                          MOV CMR,R1              ;SAVE CMR DATA
5513
     030034  000240                        25$:       NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     030036  000240                                   NOP                     ;FOR  LOOP ON ERROR

5514 030040  105037  177750                          CLRB CMR                ;DISABLE MAINT. MODE
5515 030044  012737  001015  177746                  MOV #OFF,CCR            ;DISABLE CACHE
5516 030052  032701  001000                          BIT #TPB,R1             ;CHECK FOR 0
5517 030056  001403                                  BEQ 10$                 ;PASS
5518
5519
     030060  104000                                  ERROR                           ;ERROR
                                                                                      ;-----
     030062  030060                                  .-2
5520                                                                         ;TAG PARITY GEN. & STORE TESTS
5521                                                                         ;READING CACHE MAINT. REGISTER
5522                                                                         ;BIT 9 FOR TAG PARITY DATA DID
5523                                                                         ;NOT RESULT IN 0.
5524 030064  000000                                  0
5525                                 ;;;
5526 030066  000240                        10$:       NOP             ;END OF TEST
5527
5528
5529 030070  005237  001464              T157:       INC $TESTN                  ;UPDATE TEST ID
                                         ;;**************************************************************
                                         .SBTTL
                                         .SBTTL TEST 157
                                         .SBTTL
5530                                     .SBTTL  VERIFY THAT TAG PARITY GENERATOR WILL WRITE A 1 INTO TAG PARITY STORE
5531                                     .SBTTL  ADDRESS 0000 FOR FLOATING 1 PATTERN ON TAG PARITY GENERATOR INPUTS
5532                                     .SBTTL
5533                                     ;;;             PROCEDURE: GENERATE 1 FROM TAG   PARITY
5534                                     ;;;                         GENERATOR BY PLACING FLOATING 1 PATTERN ON INPUTS
5535                                     ;;;                        AND WRITING   1  INTO TAG PARITY STORE
5536                                     ;;;                        LOCATION 0000.READ TAG PARITY STORE BIT FROM
5537                                     ;;;                        CMR<9>
5538                                     ;;;
5539                                     ;;;             CONDITIONS:
5540                                     ;;;                     INPUTS TO TAG PARITY GEN:
5541                                     ;;;                         TAG WRTD<21:13> FLOATING 1 PATTERN
5542                                     ;;;                         WWPD(1)= 0
5543                                     ;;;                        TAG PARITY STORE ADDRESS:
5544                                     ;;;                         CA<12:1>=0000
5545                                     ;;;
5546                                     ;;;             RESULT:     CMR<9>=  1
5547                                     ;;;
5548                                     ;;**************************************************************
5549 030074  000004                                  SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                     ;ERROR/LOOP ON TEST
     030076  030106                                  40$                             ;TEST START LOCATION
     030100  070014                                  1$-40$+70000-14                 ;LOOP ON ERROR START LOCATION
     030102  000000                                  0                               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     030104  070050                                  25$-40$+70000-14                ;LOOP ON ERROR END LOCATION
     030106  012737  001015  177746          40$:    MOV #OFF,CCR                    ;DISABLE CACHE
     030114  004437  002352                          JSR R4,RELCTH                   ;LOCATE TEST CODE TO HIGH CACHE SPACE
     030120  030244                                  10$+2                           ;ADDRESS OF START OF NEXT TEST
```

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

5550 030122  012737  000001  047332          MOV #1,FLTPAT           ;IST FLOATING PATTERN
5551 030130  013737  047332  177752  2$:     MOV FLTPAT,CHR          ;LOAD AMR<8:0> BY WRITING FLOATING
5552                                                                 ;PATTERN TO CHR<8:0>.
5553 030136  112737  000003  177750  1$:     MOVB #HODO+TDAR,CMR     ; HODO ALLOWS TAG
5554                                                                 ;PARITY STORE BIT TO BE WRITTEN TO
5555                                                                 ;CMR<9> ONLY DURING THE  DESTINATION
5556                                                                 ;ACCESS OF AN INSTRUCTION.
5557                                                                 ;TDAR ALLOWS INPUTS TO TAG PARITY STORE
5558                                                                 ;GENERATOR TO BE LOADED FROM AMR<8:0>
5559 030144  012737  000015  177746          MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE PARITY
5560                                                                 ;STORE
5561 030152  005737  040000                  TST 40000               ;
5562 030156  005737  060000                  TST 60000               ;PLACE FLOATING 1 PATTERN ON TAG  WRTD<21:13> INPUTS
5563                                                                 ;THEREBY WRITING 1 INTO PARITY STORE LOCATION 0000.
5564 030162  005737  060000                  TST 60000               ;WRITE TAG PARITY BIT FROM
5565                                                                 ;LOCAT. 0000 INTO CMR<9>
5566 030166  013701  177750                  MOV CMR,R1              ;SAVE CMR DATA
5567
     030172  000240              25$:        NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     030174  000240                          NOP                     ;FOR  LOOP ON ERROR

5568 030176  105037  177750                  CLRB CMR                ;DISABLE MAINT. MODE
5569 030202  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
5570 030210  032701  001000                  BIT #TPB,R1             ;CHECK FOR 1
5571 030214  001004                          BNE 9$                  ;PASS
5572
     030216  104000                          ERROR                           ;ERROR
                                                                             ;-----
     030220  030216                          .-2
5573                                                                 ;TAG PARITY GEN. & STORE TESTS
5574                                                                 ;READING CACHE MAINT. REGISTER
5575                                                                 ;BIT 9 FOR TAG PARITY DATA DID
5576                                                                 ;NOT RESULT IN 1.
5577 030222  047332                          FLTPAT                  ;PRINT FLOATING 1 PATTERN USED ON
5578                                                                 ;TAG PARITY GEN. INPUTS: TAG WRTD<21:13>
5579 030224  000000                          0
5580                                 ;;;
5581 030226  006337  047332          9$:     ASL FLTPAT              ;NEXT PATTERN
5582 030232  032737  001000  047332          BIT #1000,FLTPAT                ;HAS PATTERN 400 BEEN DONE
5583 030240  001733                          BEQ 2$                  ;NO,CONTINUE
5584 030242  000240                  10$:    NOP             ;END OF TEST
5585
5586
5587 030244  005237  001464          T160:   INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 160
                                     .SBTTL
5588                                 .SBTTL  VERIFY WRITE WRONG PARITY TO TAG PARITY STORE
5589                                 .SBTTL
5590                                 ;;;             CONDITIONS:
```

```
5592                                    ;;;                 INPUTS TO TAG PARITY GEN:
5593                                    ;;;                     TAG WRTD<21:13> ALL 0'S
5594                                    ;;;                     WWPT(1)= 1
5595                                    ;;;                 TAG PARITY STORE ADDRESS:
5596                                    ;;;                     CA<12:1>=0000
5597                                    ;;;
5598                                    ;;;             RESULT:     CMR<9>=  1
5599                                    ;;;
5600                                    ;;;*************************************************************************
5601 030250  000004                                       SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                         ;ERROR/LOOP ON TEST
     030252  030262                                       40$                             ;TEST START LOCATION
     030254  070004                                       1$-40$+70000-14                 ;LOOP ON ERROR START LOCATION
     030256  000000                                       0                               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     030260  070040                                       25$-40$+70000-14                ;LOOP ON ERROR END LOCATION
     030262  012737  001015  177746          40$:        MOV #OFF,CCR                    ;DISABLE CACHE
     030270  004437  002352                               JSR R4,RELCTH                   ;LOCATE TEST CODE TO HIGH CACHE SPACE
     030274  030410                                       10$+2                           ;ADDRESS OF START OF NEXT TEST

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

5602 030276  005037  177752                               CLR CHR                         ;LOAD AMR<8:0> WITH 0'S BY WRITING TO CHR<8:0>
5603 030302  112737  000003  177750          1$:         MOVB #HODO+TDAR,CMR             ;HODO   ALLOWS TAG
5604                                                                                     ;PARITY STORE BITS TO BE WRITTEN TO
5605                                                                                     ;CMR<9> ONLY DURING THE  DESTINATION
5606                                                                                     ;ACCESS OF AN INSTRUCTION.
5607                                                                                     ;TDAR ALLOWS INPUTS TO TAG PARITY GEN.
5608                                                                                     ;TO BE LOADED FROM AMR<8:0>
5609 030310  012737  002015  177746                       MOV #15+WWPT,CCR                ;NO UCB SO AS TO WRITE ENABLE PARITY.
5610                                                                                     ;ENABLE WRITE WRONG PARITY TAG
5611 030316  005737  040000                               TST 40000                       ;
5612 030322  005737  060000                               TST 60000                       ;PLACE ALL 0'S ON TAG WRTD<20:13> INPUTS
5613                                                                                     ;SINCE WWPT IS INVOKED A 1 WILL BE
5614                                                                                     ;WRITTEN INTO PARITY STORE LOCATION 0000.
5615 030326  005737  060000                               TST 60000                       ;WRITE TAG BIT FROM
5616                                                                                     ;LOCAT. 0000 INTO CMR<9>
5617 030332  013701  177750                               MOV CMR,R1                      ;SAVE CMR DATA
5618
     030336  000240                          25$:        NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
     030340  000240                                       NOP                             ;FOR  LOOP ON ERROR

5619 030342  012737  001015  177746                       MOV #OFF,CCR                    ;DISABLE CACHE
5620 030350  105037  177750                               CLRB CMR                        ;DISABLE MAINT. MODE
5621 030354  052737  000400  177746                       BIS #FC,CCR                     ;BEFORE LEAVING TEST FLUSH CACHE
5622 030362  032737  010000  177746                       BIT #VCIP,CCR                   ;WAIT TILL DONE
5623 030370  001374                                       BNE .-6                         ;
5624 030372  032701  001000                               BIT #TPB,R1                     ;CHECK 1 FOR TAG PARITY STORE.
5625 030376  001003                                       BNE 10$                         ;PASS
5626
     030400  104000                                       ERROR                                   ;ERROR
                                                                                                   ;-----
     030402  030400                                       .-2
5627                                                                                     ;TAG PARITY GEN. & STORE TESTS
5628                                                                                     ;READING CACHE MAINT. REGISTER
5629                                                                                     ;BIT 9 FOR TAG PARITY DATA DID
5630                                                                                     ;NOT RESULT IN 1.
```

```
030404  000000                                      0
                                    ;;;
030406  000240                              10$:    NOP                     ;END OF TEST



030410  005237  001464              T161:           INC $TESTN              ;UPDATE TEST ID
                                    ;;*******************************************************************
                                    .SBTTL
                                    .SBTTL TEST 161
                                    .SBTTL
                                    .SBTTL  WRITE AND READ 0'S TO ALL LOW CACHE DATA PARITY AND TAG PARITY STORES
                                    .SBTTL
                                    ;;;                     CONDITIONS:
                                    ;;;                             INPUTS TO DATA PARITY GEN:
                                    ;;;                                  WRTD<15:0> ALL 0'S
                                    ;;;                                  WWPD(1)= 0
                                    ;;;                             INPUTS TO TAG PARITY GEN.:
                                    ;;;                                  TAG WRTD<21:13> ALL 0'S
                                    ;;;                                  WWPT(1)=0
                                    ;;;                                DATA PARITY/TAG PARITY STORE ADDRESS:
                                    ;;;                                  CA<12:1>=0000 TO 3777
                                    ;;;
                                    ;;;                     RESULT:      CMR<11:9> ALL 0
                                    ;;;
                                    ;;*******************************************************************
030414  000004                                      SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                            ;ERROR/LOOP ON TEST
030416  030426                                      40$                     ;TEST START LOCATION
030420  070030                                      1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
030422  000000                                      0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
030424  070056                                      25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
030426  012737  001015  177746              40$:    MOV #OFF,CCR            ;DISABLE CACHE
030434  004437  002352                              JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
030440  030640                                      10$+2                   ;ADDRESS OF START OF NEXT TEST

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

030442  005037  177752                              CLR CHR                 ;LOAD AMR<8:0> WITH ALL 0'S
030446  012705  060000                              MOV #60000,R5           ;ADDRESS 60000 TO R5
030452  005025                              2$:     CLR (R5)+               ;CLEAR ALL LOW CACHE MAIN MEMORY
030454  020527  070000                              CMP R5,#70000
030460  001374                                      BNE 2$
030462  012705  060000                              MOV #60000,R5           ;1ST ADDRESS LOCATION IN R5
030466  012703  040000                              MOV #40000,R3           ;ADDRESS 40000 IN R3
030472  112737  000003  177750              1$:     MOVB #HODO+TDAR,CMR     ;HODO ALLOWS DATA PARITY/TAG PARITY
                                                                            ; STORE BITS TO BE WRITTEN TO
                                                                            ;CMR<11:9> ONLY DURING THE  DESTINATION
                                                                            ;ACCESS OF AN INSTRUCTION.
                                                                            ;TDAR ALLOWS TAG PARITY STORE GENERATOR
                                                                            ;INPUTS TO BE LOADED FROM AMR<8:0>
030500  012737  000015  177746                      MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE PARITY
                                                                            ;STORE
030506  005713                                      TST (R3)                ;
030510  005715                                      TST (R5)                ;WRITE 0'S INTO DATA/TAG PARITY STORE
                                                                            ;ADDRESS LOCATION SPECIFIED BY R5
```

```
5672 030512  005715                          TST (R5)              ;WRITE DATA/TAG PARITY BITS INTO CMR<11:9>
5673 030514  013701  177750                  MOV CMR,R1            ;SAVE CMR DATA
5674
     030520  000240                  25$:    NOP                   ;INSTRUCTION 'JMP 1$' PLACED HERE
     030522  000240                          NOP                   ;FOR  LOOP ON ERROR

5675 030524  105037  177750                  CLRB CMR              ;DISABLE MAINT. MODE
5676 030530  012737  001015  177746          MOV #OFF,CCR          ;DISABLE CACHE
5677 030536  010537  047322                  MOV R5,CA121          ;GET PARITY ADDRESS LOCATION USED
5678 030542  006237  047322                  ASR CA121             ;PREPARE CA121 FOR TYPEOUT
5679 030546  032701  004000                  BIT #HPB,R1           ;CHECK  0 HI BYTE PARITY STORE
5680 030552  001404                          BEQ 7$                ;PASS
5681
     030554  104000                          ERROR                         ;ERROR
                                                                           ;-----
     030556  030554                          .-2
5682                                                               ;DATA/TAG PARITY GEN. & STORE TESTS
5683                                                               ;READING CACHE MAINT. REGISTER
5684                                                               ;BIT 11 FOR UPPER BYTE PARITY DATA DID
5685                                                               ;NOT RESULT IN 0.
5686 030560  047322                          CA121                 ;PRINT PARITY STORE ADDRESS LOCATION
5687                                                               ;USED: CA<12:1>
5688 030562  000000                          0
5689                                  :::
5690 030564  032701  002000          7$:     BIT #LPB,R1           ;CHECK 0 FOR LOWER BYTE PARITY DATA
5691 030570  001404                          BEQ 8$                ;PASS
5692
5693
     030572  104000                          ERROR                         ;ERROR
                                                                           ;-----
     030574  030572                          .-2
5694                                                               ;DATA/TAG PARITY GEN. $ STORE TESTS
5695                                                               ;READING CACHE MAINT. REGISTER
5696                                                               ;BIT 10 FOR LOWER BYTE PARITY DATA DID
5697                                                               ;NOT RESULT IN 0.
5698 030576  047322                          CA121                 ;PRINT PARITY STORE ADDRESS USED:CA<12:1>
5699 030600  000000                          0
5700                                  :::
5701 030602  032701  001000          8$:     BIT #TPB,R1           ;CHECK 0 FOR TAG PARITY DATA
5702 030606  001404                          BEQ 9$                ;PASS
5703
     030610  104000                          ERROR                         ;ERROR
                                                                           ;-----
     030612  030610                          .-2
5704                                                               ;DATA/TAG PARITY GEN. AND STORAGE TESTS
5705                                                               ;READING CACHE MAINT.REGISTER BIT 9 FOR
5706                                                               ;TAG PARITY DATA DID NOT RESULT IN 0.
5707 030614  047322                          CA121                 ;PRINT PARITY STORE ADDRESS USED: CA<12:1>
5708 030616  000000                          0
5709                                  :::
5710 030620  062705  000002          9$:     ADD #2,R5             ;NEXT PARITY STORE ADDRESS LOCATION
5711 030624  062703  000002                  ADD #2,R3
5712 030630  022705  070000                  CMP #70000,R5         ;HAVE ALL LOW CACHE PARITY STORE ADDRESS
5713                                                               ;LOCATIONS BEEN DONE
5714 030634  001316                          BNE 1$                ;NO,CONTINUE
5715 030636  000240                  10$:    NOP             ;END OF TEST
5716
```

```
                                        T162:           INC $TESTN              ;UPDATE TEST ID
                                        ;;*****************************************************************
                                        .SBTTL
                                        .SBTTL TEST 162
                                        .SBTTL
                                        .SBTTL  WRITE AND READ 0'S TO ALL HI CACHE DATA PARITY AND TAG PARITY STORES
                                        .SBTTL
                                        ;;;             CONDITIONS:
                                        ;;;                     INPUTS TO DATA PARITY GEN:
                                        ;;;                         WRTD<15:0> ALL 0'S
                                        ;;;                         WWPD(1)= 0
                                        ;;;                     INPUTS TO TAG PARITY GEN.:
                                        ;;;                         TAG WRTD<21:13> ALL 0'S
                                        ;;;                         WWPT(1)=0
                                        ;;;                       DATA PARITY/TAG PARITY STORE ADDRESS:
                                        ;;;                         CA<12:1>=4000 TO 7777
                                        ;;;
                                        ;;;             RESULT:     CMR<11:9> ALL 0
                                        ;;;
                                        ;;*****************************************************************
030644  000004                                      SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                            ;ERROR/LOOP ON TEST
030646  030656                                      40$                     ;TEST START LOCATION
030650  060030                                      1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
030652  000000                                      0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
030654  060056                                      25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
030656  012737  001015  177746          40$:       MOV #OFF,CCR            ;DISABLE CACHE
030664  004437  002324                             JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
030670  031070                                     10$+2                   ;ADDRESS OF START OF NEXT TEST

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

030672  005037  177752                             CLR CHR                 ;LOAD AMR<8:0> WITH ALL 0'S
030676  012705  070000                             MOV #70000,R5           ;ADDRESS 70000 TO R5
030702  005025                          2$:        CLR (R5)+               ;CLEAR ALL HI CACHE MAIN MEMORY
030704  020527  100000                             CMP R5,#100000
030710  001374                                     BNE 2$
030712  012705  070000                             MOV #70000,R5           ;1ST ADDRESS LOCATION IN R5
030716  012703  050000                             MOV #50000,R3           ;ADDRESS 50000 IN R3
030722  112737  000003  177750          1$:        MOVB #HODO+TDAR,CMR     ;HODO ALLOWS DATA PARITY/TAG PARITY
                                                                            ; STORE BITS TO BE WRITTEN TO
                                                                            ;CMR<11:9> ONLY DURING THE  DESTINATION
                                                                            ;ACCESS OF AN INSTRUCTION.
                                                                            ;TDAR ALLOWS TAG PARITY STORE GENERATOR
                                                                            ;INPUTS TO BE LOADED FROM AMR<8:0>
030730  012737  000015  177746                     MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE PARITY
                                                                            ;STORE
030736  005713                                     TST (R3)                ;
030740  005715                                     TST (R5)                ;WRITE 0'S INTO DATA/TAG PARITY STORE
                                                                            ;ADDRESS LOCATION SPECIFIED BY R5
030742  005715                                     TST (R5)                ;WRITE DATA/TAG PARITY BITS INTO CMR<11:9>
030744  013701  177750                             MOV CMR,R1              ;SAVE CMR DATA
```

```
                030750  000240                          25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
                030752  000240                                  NOP                     ;FOR  LOOP ON ERROR

 5758           030754  105037  177750                          CLRB CMR                ;DISABLE MAINT. MODE
 5759           030760  012737  001015  177746                 MOV #OFF,CCR            ;DISABLE CACHE
 5760           030766  010537  047322                         MOV R5,CA121            ;GET PARITY ADDRESS LOCATION USED
 5761           030772  006237  047322                         ASR CA121               ;PREPARE CA121 FOR TYPEOUT
 5762           030776  032701  004000                         BIT #HPB,R1             ;CHECK  0 HI BYTE PARITY STORE
 5763           031002  001404                                 BEQ 7$                  ;PASS
 5764
                031004  104000                                 ERROR                           ;ERROR
                                                                                        ;-----
                031006  031004                                 .-2
 5765                                                                                   ;DATA/TAG PARITY GEN. & STORE TESTS
 5766                                                                                   ;READING CACHE MAINT. REGISTER
 5767                                                                                   ;BIT 11 FOR UPPER BYTE PARITY DATA DID
 5768                                                                                   ;NOT RESULT IN 0.
 5769           031010  047322                                 CA121                   ;PRINT PARITY STORE ADDRESS LOCATION
 5770                                                                                   ;USED: CA<12:1>
 5771           031012  000000                                 0
 5772                                           ;;;
 5773           031014  032701  002000          7$:    BIT #LPB,R1             ;CHECK 0 FOR LOWER BYTE PARITY DATA
 5774           031020  001404                         BEQ 8$                  ;PASS
 5775
                031022  104000                         ERROR                           ;ERROR
                                                                                        ;-----
                031024  031C22                         .-2
 5776                                                                                   ;DATA/TAG PARITY GEN. $ STORE TESTS
 5777                                                                                   ;READING CACHE MAINT. REGISTER
 5778                                                                                   ;BIT 10 FOR LOWER BYTE PARITY DATA DID
 5779                                                                                   ;NOT RESULT IN 0.
 5780           031026  047322                         CA121                   ;PRINT PARITY STORE ADDRESS USED:CA<12:1>
 5781           031030  000000                         0
 5782                                           ;;;
 5783           031032  032701  001000          8$:    BIT #TPB,R1             ;CHECK 0 FOR TAG PARITY DATA
 5784           031036  001404                         BEQ 9$                  ;PASS
 5785
                031040  104000                         ERROR                           ;ERROR
                                                                                        ;-----
                031042  031040                         .-2
 5786                                                                                   ;DATA/TAG PARITY GEN. AND STORAGE TESTS
 5787                                                                                   ;READING CACHE MAINT.REGISTER BIT 9 FOR
 5788                                                                                   ;TAG PARITY DATA DID NOT RESULT IN 0.
 5789           031044  047322                         CA121                   ;PRINT PARITY STORE ADDRESS USED: CA<12:1>
 5790           031046  000000                         0
 5791                                           ;;;
 5792           031050  062705  000002          9$:    ADD #2,R5               ;NEXT PARITY STORE ADDRESS LOCATION
 5793           031054  062703  000002                 ADD #2,R3
 5794           031060  022705  100000                 CMP #100000,R5          ;HAVE ALL HI CACHE PARITY STORE ADDRESS
 5795                                                                           ;LOCATIONS BEEN DONE
 5796           031064  001316                         BNE 1$                  ;NO,CONTINUE
 5797           031066  000240          10$:   NOP             ;END OF TEST
 5798
 5799
 5800
 5801
 5802
```

```
5803 031070  005237  001464          T163:       INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 163
                                     .SBTTL
5804                                 .SBTTL  WRITE AND READ 1'S TO ALL LOW CACHE DATA PARITY AND TAG PARITY STORES
5805                                 .SBTTL
5806                                 ;;;             CONDITIONS:
5807                                 ;;;                     INPUTS TO DATA PARITY GEN:
5808                                 ;;;                         WRTD<15:0>= 000401
5809                                 ;;;                         WWPD(1)= 0
5810                                 ;;;                     INPUTS TO TAG PARITY GEN.:
5811                                 ;;;                         TAG WRTD<21:13> BIT PATTERN 000000001
5812                                 ;;;                         WWPT(1)=0
5813                                 ;;;                       DATA PARITY/TAG PARITY STORE ADDRESS:
5814                                 ;;;                        CA<12:1>=0000 TO 3777
5815                                 ;;;
5816                                 ;;;             RESULT:     CMR<11:9> ALL 1'S
5817                                 ;;;
5818                                 ;;*****************************************************************
5819 031074  000004                          SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                             ;ERROR/LOOP ON TEST
      031076  031106                         40$                             ;TEST START LOCATION
      031100  070034                         1$-40$+70000-14                 ;LOOP ON ERROR START LOCATION
      031102  000000                         0                               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      031104  070062                         25$-40$+70000-14                ;LOOP ON ERROR END LOCATION
      031106  012737  001015  177746  40$:   MOV #OFF,CCR                    ;DISABLE CACHE
      031114  004437  002352                 JSR R4,RELCTH                   ;LOCATE TEST CODE TO HIGH CACHE SPACE
      031120  031324                         10$+2                           ;ADDRESS OF START OF NEXT TEST

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

5820 031122  012737  000001  177752          MOV #1,CHR                      ;LOAD AMR<8:0> WITH BIT PATTERN
5821                                                                         ;000000001
5822 031130  012705  060000                  MOV #60000,R5                   ;ADDRESS 60000 TO R5
5823 031134  012725  000401          2$:     MOV #401,(R5)+                  ;WRITE A 401 IN ALL LOW CACHE MAIN
5824                                                                         ;MEMORY
5825 031140  020527  070000                  CMP R5,#70000
5826 031144  001373                          BNE 2$
5827 031146  012705  060000                  MOV #60000,R5                   ;1ST ADDRESS LOCATION IN R5
5828 031152  012703  040000                  MOV #40000,R3                   ;ADDRESS 40000 IN R3
5829 031156  112737  000003  177750  1$:     MOVB #HODO+TDAR,CMR             ;HODO ALLOWS DATA PARITY/TAG PARITY
5830                                                                         ; STORE BITS TO BE WRITTEN TO
5831                                                                         ;CMR<11:9> ONLY DURING THE  DESTINATION
5832                                                                         ;ACCESS OF AN INSTRUCTION.
5833                                                                         ;TDAR ALLOWS TAG PARITY STORE GENERATOR
5834                                                                         ;INPUTS TO BE LOADED FROM AMR<8:0>
5835 031164  012737  000015  177746          MOV #15,CCR                     ;NO UCB SO AS TO WRITE ENABLE PARITY
5836                                                                         ;STORE
5837 031172  005713                          TST (R3)                        ;
5838 031174  005715                          TST (R5)                        ;WRITE 1'S INTO DATA/TAG PARITY STORE
5839                                                                         ;ADDRESS LOCATION SPECIFIED BY R5
5840 031176  005715                          TST (R5)                        ;WRITE DATA/TAG PARITY BITS INTO CMR<11:9>
5841 031200  013701  177750                  MOV CMR,R1                      ;SAVE CMR DATA
5842
      031204  000240                25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
```

```
        031206  000240                          NOP                     ;FOR  LOOP ON ERROR

 5843 031210  105037  177750                    CLRB CMR                ;DISABLE MAINT. MODE
 5844 031214  012737  001015  177746            MOV #OFF,CCR            ;DISABLE CACHE
 5845 031222  010537  047322                    MOV R5,CA121            ;GET PARITY ADDRESS LOCATION USED
 5846 031226  006237  047322                    ASR CA121               ;PREPARE CA121 FOR TYPEOUT
 5847 031232  032701  004000                    BIT #HPB,R1             ;CHECK  1 HI BYTE PARITY STORE
 5848 031236  001004                            BNE 7$                  ;PASS
 5849
        031240  104000                          ERROR                           ;ERROR
                                                                                 ;-----
        031242  031240                          .-2
 5850                                                                    ;DATA/TAG PARITY GEN. & STORE TESTS
 5851                                                                    ;READING CACHE MAINT. REGISTER
 5852                                                                    ;BIT 11 FOR UPPER BYTE PARITY DATA DID
 5853                                                                    ;NOT RESULT IN 1.
 5854 031244  047322                            CA121                   ;PRINT PARITY STORE ADDRESS LOCATION
 5855                                                                    ;USED: CA<12:1>
 5856 031246  000000                            0
 5857                                                                    ;;;
 5858 031250  032701  002000            7$:     BIT #LPB,R1             ;CHECK 1 FOR LOWER BYTE PARITY DATA
 5859 031254  001004                            BNE 8$                  ;PASS
 5860
 5861
        031256  104000                          ERROR                           ;ERROR
                                                                                 ;-----
        031260  031256                          .-2
 5862                                                                    ;DATA/TAG PARITY GEN. & STORE TESTS
 5863                                                                    ;READING CACHE MAINT. REGISTER
 5864                                                                    ;BIT 10 FOR LOWER BYTE PARITY DATA DID
 5865                                                                    ;NOT RESULT IN 1.
 5866 031262  047322                            CA121                   ;PRINT PARITY STORE ADDRESS USED:CA<12:1>
 5867 031264  000000                            0
 5868                                                                    ;;;
 5869 031266  032701  001000            8$:     BIT #TPB,R1             ;CHECK 1 FOR TAG PARITY DATA
 5870 031272  001004                            BNE 9$                  ;PASS
 5871
        031274  104000                          ERROR                           ;ERROR
                                                                                 ;-----
        031276  031274                          .-2
 5872                                                                    ;DATA/TAG PARITY GEN. AND STORAGE TESTS
 5873                                                                    ;READING CACHE MAINT.REGISTER BIT 9 FOR
 5874                                                                    ;TAG PARITY DATA DID NOT RESULT IN 1.
 5875 031300  047322                            CA121                   ;PRINT PARITY STORE ADDRESS USED: CA<12:1>
 5876 031302  000000                            0
 5877                                                                    ;;;
 5878 031304  062705  000002            9$:     ADD #2,R5               ;NEXT PARITY STORE ADDRESS LOCATION
 5879 031310  062703  000002                    ADD #2,R3
 5880 031314  022705  070000                    CMP #70000,R5           ;HAVE ALL LOW CACHE PARITY STORE ADDRESS
 5881                                                                    ;LOCATIONS BEEN DONE
 5882 031320  001316                            BNE 1$                  ;NO,CONTINUE
 5883 031322  000240                    10$:    NOP             ;END OF TEST
 5884
 5885
 5886
 5887
 5888 031324  005237  001464        T164:       INC $TESTN              ;UPDATE TEST ID
```

```
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 164
                                .SBTTL
 5889                           .SBTTL  WRITE AND READ 1'S TO ALL HI CACHE DATA PARITY AND TAG PARITY STORES
 5890                           .SBTTL
 5891                           ;;;             CONDITIONS:
 5892                           ;;;                     INPUTS TO DATA PARITY GEN:
 5893                           ;;;                         WRTD<15:0>= 000401
 5894                           ;;;                         WWPD(1)= 0
 5895                           ;;;                     INPUTS TO TAG PARITY GEN.:
 5896                           ;;;                         TAG WRTD<21:13> =BIT PATTERN 000000001
 5897                           ;;;                         WWPT(1)=0
 5898                           ;;;                       DATA PARITY/TAG PARITY STORE ADDRESS:
 5899                           ;;;                        CA<12:1>=4000 TO 7777
 5900                           ;;;
 5901                           ;;;             RESULT:     CMR<11:9> ALL 1'S
 5902                           ;;;
 5903                           ;;*****************************************************************
 5904 031330  000004                       SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
      031332  031342                       40$                     ;TEST START LOCATION
      031334  060034                       1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
      031336  000000                       0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      031340  060062                       25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
      031342  012737  001015  177746  40$: MOV #OFF,CCR             ;DISABLE CACHE
      031350  004437  002324               JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
      031354  031560                       10$+2                   ;ADDRESS OF START OF NEXT TEST

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

 5905 031356  012737  000001  177752       MOV #1,CHR              ;LOAD AMR<8:0> WITH BIT PATTERN 000000001
 5906 031364  012705  070000               MOV #70000,R5           ;ADDRESS 70000 TO R5
 5907 031370  012725  000401          2$:  MOV #401,(R5)+          ;WRITE A 401 TO ALL HI CACHE
 5908 031374  020527  100000               CMP R5,#100000
 5909 031400  001373                       BNE 2$
 5910 031402  012705  070000               MOV #70000,R5           ;1ST ADDRESS LOCATION IN R5
 5911 031406  012703  050000               MOV #50000,R3           ;ADDRESS 50000 IN R3
 5912 031412  112737  000003  177750  1$:  MOVB #HODO+TDAR,CMR      ;HODO ALLOWS DATA PARITY/TAG PARITY
 5913                                       ; STORE BITS TO BE WRITTEN TO
 5914                                       ;CMR<11:9> ONLY DURING THE  DESTINATION
 5915                                       ;ACCESS OF AN INSTRUCTION.
 5916                                       ;TDAR ALLOWS TAG PARITY STORE GENERATOR
 5917                                       ;INPUTS TO BE LOADED FROM AMR<8:0>
 5918 031420  012737  000015  177746       MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE PARITY
 5919                                       ;STORE
 5920 031426  005713                       TST (R3)                ;
 5921 031430  005715                       TST (R5)                ;WRITE 1'S INTO DATA/TAG PARITY STORE
 5922                                       ;ADDRESS LOCATION SPECIFIED BY R5
 5923 031432  005715                       TST (R5)                ;WRITE DATA/TAG PARITY BITS INTO CMR<11:9>
 5924 031434  013701  177750               MOV CMR,R1              ;SAVE CMR DATA
 5925
      031440  000240                  25$: NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      031442  000240                       NOP                     ;FOR  LOOP ON ERROR

 5926 031444  105037  177750               CLRB CMR                ;DISABLE MAINT. MODE
```

```
5927 031450  012737  001015  177746          MOV #OFF,CCR          ;DISABLE CACHE
5928 031456  010537  047322                  MOV R5,CA121          ;GET PARITY ADDRESS LOCATION USED
5929 031462  006237  047322                  ASR CA121             ;PREPARE CA121 FOR TYPEOUT
5930 031466  032701  004000                  BIT #HPB,R1           ;CHECK  1 HI BYTE PARITY STORE
5931 031472  001004                          BNE 7$                ;PASS
5932
     031474  104000                          ERROR                         ;ERROR
                                                                           ;-----
     031476  031474                          .-2
5933                                                               ;DATA/TAG PARITY GEN. & STORE TESTS
5934                                                               ;READING CACHE MAINT. REGISTER
5935                                                               ;BIT 11 FOR UPPER BYTE PARITY DATA DID
5936                                                               ;NOT RESULT IN 1.
5937 031500  047322                          CA121                 ;PRINT PARITY STORE ADDRESS LOCATION
5938                                                               ;USED: CA<12:1>
5939 031502  000000                          0
5940                                                               ;;;
5941 031504  032701  002000          7$:     BIT #LPB,R1           ;CHECK 1 FOR LOWER BYTE PARITY DATA
5942 031510  001004                          BNE 8$                ;PASS
5943
     031512  104000                          ERROR                         ;ERROR
                                                                           ;-----
     031514  031512                          .-2
5944                                                               ;DATA/TAG PARITY GEN. $ STORE TESTS
5945                                                               ;READING CACHE MAINT. REGISTER
5946                                                               ;BIT 10 FOR LOWER BYTE PARITY DATA DID
5947                                                               ;NOT RESULT IN 1.
5948 031516  047322                          CA121                 ;PRINT PARITY STORE ADDRESS USED:CA<12:1>
5949 031520  000000                          0
5950                                                               ;;;
5951 031522  032701  001000          8$:     BIT #TPB,R1           ;CHECK 1 FOR TAG PARITY DATA
5952 031526  001004                          BNE 9$                ;PASS
5953
     031530  104000                          ERROR                         ;ERROR
                                                                           ;-----
     031532  031530                          .-2
5954                                                               ;DATA/TAG PARITY GEN. AND STORAGE TESTS
5955                                                               ;READING CACHE MAINT.REGISTER BIT 9 FOR
5956                                                               ;TAG PARITY DATA DID NOT RESULT IN 0.
5957 031534  047322                          CA121                 ;PRINT PARITY STORE ADDRESS USED: CA<12:1>
5958 031536  000000                          0
5959                                                               ;;;
5960 031540  062705  000002          9$:     ADD #2,R5             ;NEXT PARITY STORE ADDRESS LOCATION
5961 031544  062703  000002                  ADD #2,R3
5962 031550  022705  100000                  CMP #100000,R5        ;HAVE ALL HI CACHE PARITY STORE ADDRESS
5963                                                               ;LOCATIONS BEEN DONE
5964 031554  001716                          BEQ 1$                ;NO,CONTINUE
5965 031556  000240          10$:    NOP                 ;END OF TEST
5966
5967
5968
5969
5970
5971                        .SBTTL *
5972                        .SBTTL
5973                        .SBTTL *              DATA/TAG PARITY STORE ADRESS LINE TEST
5974                        .SBTTL                ----------------------------------
```

```
                                .SBTTL
                                .SBTTL *
5980 031560  005237  001464    T165:       INC $TESTN              ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 165
                                .SBTTL
                                .SBTTL
                                .SBTTL  VERIFY HI & LO BYTE DATA PARITY STORE ADDRESS LINES
                                .SBTTL
                                ;;;             PROCEDURE:      WRITE 0 INTO HI & LO BYTE DATA PARITY STORE
                                ;;;                             ADDRESS LOCATION 0000.
                                ;;;                             WRITE A 1 INTO HI & LO BYTE DATA PARITY STORE
                                ;;;                             ADDRESS LOCAT. 0001.
                                ;;;                             READ HI & LO BYTE DATA PARITY ADDRESS LOC.
                                ;;;                             0000 FOR 0'S.
                                ;;;                             REPEAT THE ABOVE SEQUENCE ,EACH TIME CHANGING THE
                                ;;;                             ADDRESS LOCATION THE 1 IS WRITTEN INTO BY
                                ;;;                             SHIFTING THE 1 ONE PLACE TO THE LEFT.
                                ;;;
                                ;;*****************************************************************
5995 031564  000004                     SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                 ;ERROR/LOOP ON TEST
     031566  031576                      40$                     ;TEST START LOCATION
     031570  070040                      1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     031572  000000                      0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     031574  070100                      25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     031576  012737  001015  177746  40$:  MOV #OFF,CCR           ;DISABLE CACHE
     031604  004437  002352              JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     031610  032034                      10$+2                   ;ADDRESS OF START OF NEXT TEST

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

5996 031612  000240                     NOP                     ;THIS 'NOP' WILL BE AT LOCATION 70000
5997                                                             ;WHEN THE TEST IS RELOCATED TO HI
5998                                                             ;CACHE. IT WILL BE OVERWRITTEN WITH
5999                                                             ;'401' WHEN THE TEST IS EXECUTED.
6000 031614  005037  060000              CLR 60000               ;CLEAR LOCATION 60000 IN MAIN MEMORY
6001 031620  012737  000002  047332      MOV #2,FLTPAT           ;1ST FLOATING CACHE DATA STORE ADDRESS PATTERN
6002 031626  012702  040000  2$:        MOV #40000,R2           ;ADDRESS 40000 INTO R2
6003 031632  012703  060000              MOV #60000,R3           ;ADRESS 60000 INTO R3
6004 031636  063702  047332              ADD FLTPAT,R2           ;R2 CONTAINS 40000+FLTPAT
6005 031642  063703  047332              ADD FLTPAT,R3           ;R3 CONTAINS 60000+FLTPAT
6006 031646  012713  000401              MOV #401,(R3)           ;ODD DATA IN HI & LO BYTE AREAS OF
6007                                                             ;LOCATION SPECIFIED BY R3
6008 031652  112737  000002  177750  1$:  MOVB #HODO,CMR         ;HODO ALLOWS HI & LO BYTE DATA PARITY
6009                                                             ;STORE BITS TO BE WRITTEN TO CMR<11:10>
6010                                                             ; ONLY DURING THE
6011                                                             ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
6012 031660  012737  000015  177746      MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE DATA PARITY STORE
6013 031666  005737  040000              TST 40000
6014 031672  005737  060000              TST 60000               ;READ UPDATE: WRITE 0'S INTO HI AND LO
6015                                                             ;BYTE DATA PARITY STORES
```

```
6016 031676  005712                          TST (R2)
6017 031700  005713                          TST (R3)          ;WRITE 1 INTO HI & LO BYTE DATA
6018                                                           ;PARITY STORE LOCATION
6019                                                           ;SPECIFIED BY R3'S BITS 1 THRU 12:CA<12:1>.
6020 031702  005737  060000                  TST 60000         ;LOAD DATA FROM HI & LO BYTE PARITY
6021                                                           ;DATA PARITY STORE LOCATION
6022                                                           ;0000 INTO CMR<11:10>.
6023 031706  013701  177750                  MOV CMR,R1        ;SAVE CMR DATA
6024
     031712  000240                  25$:    NOP               ;INSTRUCTION 'JMP 1$' PLACED HERE
     031714  000240                          NOP               ;FOR  LOOP ON ERROR

6025 031716  105037  177750                  CLRB CMR          ;DISABLE MAINT. MODE
6026 031722  012737  001015  177746          MOV #OFF,CCR      ;DISABLE CACHE
6027 031730  032701  004000                  BIT #HPB,R1       ;READING CMR<11> FOR HI BYTE
6028                                                           ;DATA PARITY STORE DATA SHOULD RESULT
6029                                                           ;IN 0.
6030 031734  001411                          BEQ 8$            ;PASS
6031 031736  013737  047332  047322          MOV FLTPAT,CA121  ;SAVE CA<12:1> USED
6032 031744  006237  047322                  ASR CA121         ;PREPARE CA121 FOR TYPEOUT
6033
     031750  104000                          ERROR                     ;ERROR
                                                                       ;-----
     031752  031750                          .-2
6034                                                           ;HI & LO BYTE DATA PARITY STORE ADDRESS TEST
6035                                                           ;HI BYTE DATA PARITY STORE LOC. 0000
6036                                                           ;DID NOT READ AS A 0 INDICATING THAT
6037                                                           ;IT WAS OVERWRITTEN WITH A 1. THIS
6038                                                           ;SUGGESTS HI BYTE DATA PARITY STORE
6039                                                           ;ADDRESS LINE IS BAD.
6040 031754  047322                          CA121             ;PRINT PARITY DTORE ADDRESS FAILURE
6041                                                           ;CA<12:1>.
6042                                                           ;NOTE THAT THE 1 IN THIS PATTERN
6043                                                           ;WILL POINT TO THE ADDRESS LINE OF
6044                                                           ;THAT BROUGHT OUT ERROR.
6045 031756  000000                          0
6046                                                                   ;;;
6047 031760  032701  004000          8$:     BIT #HPB,R1       ;READING CMR<10> FOR LO BYTE
6048                                                           ;DATA PARITY STORE DATA SHOULD RESULT
6049                                                           ;IN 0.
6050 031764  001411                          BEQ 9$            ;PASS
6051 031766  013737  047332  047322          MOV FLTPAT,CA121  ;SAVE CA<12:1> USED
6052 031774  006237  047322                  ASR CA121         ;PREPARE CA121 FOR TYPEOUT
6053
     032000  104000                          ERROR                     ;ERROR
                                                                       ;-----
     032002  032000                          .-2
6054                                                           ;HI & LO BYTE DATA PARITY STORE ADDRESS TEST
6055                                                           ;LO BYTE DATA PARITY STORE LOC. 0000
6056                                                           ;DID NOT READ AS A 0 INDICATING THAT
6057                                                           ;IT WAS OVERWRITTEN WITH A 1. THIS
6058                                                           ;SUGGESTS HI BYTE DATA PARITY STORE
6059                                                           ;ADDRESS LINE IS BAD.
6060 032004  047322                          CA121             ;PRINT PARITY STORE ADDRESS FAILURE
6061                                                           ;CA<12:1>.
6062                                                           ;NOTE THAT THE 1 IN THIS PATTERN
6063                                                           ;WILL POINT TO THE ADDRESS LINE OF
```

```
                                                        ;THAT BROUGHT OUT ERROR.
032006  000000                          0
                                                              ;;;
032010  006337  047332          9$:     ASL FLTPAT            ;NEXT PATTERN
032014  022737  020000  047332          CMP #20000,FLTPAT     ;HAS DATA PARITY  STORE  ADDRESS 4000 BEEN DONE?
032022  001301                          BNE 2$                ;NO
032024  012737  000240  070000          MOV #240,70000        ;RESTORE OVERWRITTEN LOCATION 70000
                                                              ;WITH NOP.
032032  000240                  10$:    NOP             ;END OF TEST


                        T166:           INC $TESTN            ;UPDATE TEST ID
                        ;;*****************************************************************
                        .SBTTL
                        .SBTTL TEST 166
                        .SBTTL
                        .SBTTL
                        .SBTTL  VERIFY TAG PARITY STORE ADDRESS LINES
                        .SBTTL
                        ;;;             PROCEDURE:      WRITE 0 INTO TAG PARITY STORE
                        ;;;                             ADDRESS LOCATION 0000.
                        ;;;                             WRITE A 1 INTO TAG PARITY STORE
                        ;;;                             ADDRESS LOCAT. 0001.
                        ;;;                             READ TAG PARITY ADDRESS LOC.
                        ;;;                             0000 FOR 0'S.
                        ;;;                             REPEAT THE ABOVE SEQUENCE ,EACH TIME CHANGING THE
                        ;;;                             ADDRESS LOCATION THE 1 IS WRITTEN INTO BY
                        ;;;                             SHIFTING THE 1 ONE PLACE TO THE LEFT.
                        ;;;
                        ;;*****************************************************************
032040  000004                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
032042  032052                        40$                     ;TEST START LOCATION
032044  070026                        1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
032046  000000                        0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
032050  070066                        25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
032052  012737  001015  177746  40$:   MOV #OFF,CCR            ;DISABLE CACHE
032060  004437  002352                JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
032064  032240                        10$+2                   ;ADDRESS OF START OF NEXT TEST

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

032066  012737  000002  047332          MOV #2,FLTPAT           ;1ST FLOATING CACHE DATA STORE ADDRESS PATTERN
032074  012702  040000          2$:     MOV #40000,R2           ;ADDRESS 40000 INTO R2
032100  012703  060000                  MOV #60000,R3           ;ADRESS 60000 INTO R3
032104  063702  047332                  ADD FLTPAT,R2           ;R2 CONTAINS 40000+FLTPAT
032110  063703  047332                  ADD FLTPAT,R3           ;R3 CONTAINS 60000+FLTPAT
032114  112737  000002  177750  1$:     MOVB #HODO,CMR          ;HODO ALLOWS TAG PARITY
                                                                ;STORE BITS TO BE WRITTEN TO CMR<9>
                                                                ; ONLY DURING THE
                                                                ;DESTINATION MEMORY ACCESS OF AN INSTRUCTION.
032122  012737  000015  177746          MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE DATA PARITY STORE
032130  005737  040000                  TST 40000
032134  005737  060000                  TST 60000               ;READ UPDATE: WRITE 0 INTO TAG
```

```
6105
6106 032140  005713                          TST (R3)                ; PARITY STORE
6107 032142  005712                          TST (R2)
6108                                                                 ;WRITE 1 INTO TAG
6109                                                                 ;PARITY STORE LOCATION
6110 032144  005737  060000                  TST 60000               ;SPECIFIED BY R2'S BITS 1 THRU 12:CA<12:1>.
6111                                                                 ;LOAD DATA FROM
6112                                                                 ;TAG PARITY STORE LOCATION
6113 032150  013701  177750                  MOV CMR,R1              ;0000 INTO CMR<9>.
6114                                                                 ;SAVE CMR DATA
     032154  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     032156  000240                          NOP                     ;FOR  LOOP ON ERROR
6115 032160  105037  177750                  CLRB CMR                ;DISABLE MAINT. MODE
6116 032164  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
6117 032172  032701  001000                  BIT #TPB,R1             ;READING CMR<9> FOR TAG PARITY STORE
6118                                                                 ;DATA SHOULD RESULT IN 0
6119 032176  001411                          BEQ 9$                  ;PASS
6120 032200  013737  047332  047322          MOV FLTPAT,CA121        ;SAVE CA<12:1> USED
6121 032206  006237  047322                  ASR CA121               ;PREPARE CA121 FOR TYPEOUT
6122
     032212  104000                          ERROR                           ;ERROR
                                                                             ;-----
     032214  032212                          .-2
6123                                                                 ;TAG PARITY STORE ADDRESS TEST
6124                                                                 ;TAG PARITY STORE LOC. 0000
6125                                                                 ;DID NOT READ AS A 0 INDICATING THAT
6126                                                                 ;IT WAS OVERWRITTEN WITH A 1. THIS
6127                                                                 ;SUGGESTS TAG PARITY STORE
6128                                                                 ;ADDRESS LINE IS BAD.
6129 032216  047322                          CA121                   ;PRINT PARITY STORE ADDRESS FAILURE
6130                                                                 ;CA<12:1>.
6131                                                                 ;NOTE THAT THE 1 IN THIS PATTERN
6132                                                                 ;WILL POINT TO THE ADDRESS LINE OF
6133                                                                 ;THAT BROUGHT OUT ERROR.
6134 032220  000000                          0
6135                                                                 ;;;
6136 032222  006337  047332          9$:     ASL FLTPAT              ;NEXT PATTERN
6137 032226  022737  020000  047332          CMP #20000,FLTPAT       ;HAS TAG PARITY  STORE  ADDRESS 4000 BEEN DONE?
6138 032234  001317                          BNE 2$                  ;NO
6139 032236  000240                  10$:    NOP                     ;END OF TEST
6140
6141
6142
6143
6144                                 .SBTTL *
6145                                 .SBTTL
6146                                 .SBTTL *            DATA/TAG PARITY ERROR CHECKING
6147                                 .SBTTL              ------------------------------
6148                                 .SBTTL
6149                                 .SBTTL *
6150
6151
6152
6153
6154
6155
```

```
                                T167:           INC $TESTN              ;UPDATE TEST ID
                                ;;*************************************************************
                                .SBTTL
                                .SBTTL TEST 167
                                .SBTTL
                                .SBTTL
                                .SBTTL  VERIFY THAT ALL PARITY ERROR BITS IN CACHE MEMORY ERROR REGISTER
                                .SBTTL  WILL READ 0 FOLLOWING A WRITE TO CME.
                                .SBTTL
                                ;;*************************************************************
032244  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
032246  032256                                  40$                     ;TEST START LOCATION
032250  070000                                  1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
032252  000000                                  0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
032254  070016                                  25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
032256  012737  001015  177746          40$:    MOV #OFF,CCR            ;DISABLE CACHE
032264  004437  002352                          JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
032270  032342                                  10$+2                   ;ADDRESS OF START OF NEXT TEST

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

032272  112737  000002  177750          1$:     MOVB #HODO,CMR          ;HODO WILL ALLOW CLOCKING OF PARITY INFO.
                                                                        ;TO CME ONLY DURING THE DESTINATION ACCESS OF AN
                                                                        ;INSTRUCTION. THE EFFECT
                                                                        ;IS THAT NO CLOCKING WILL OCCUR DURING EXECUTION
                                                                        ;OF THE NEXT  INSTRUCTION.
032300  005037  177744                          CLR CME                 ;WRITE TO CME
032304  013701  177744                          MOV CME,R1              ;SAVE CME CONTENTS.

032310  000240                          25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
032312  000240                                  NOP                     ;FOR  LOOP ON ERROR

032314  105037  177750                          CLRB CMR                ;DISABLE MAINTENANCE MODE
032320  005701                                  TST R1          ;ARE ALL BITS 0?
032322  001406                                  BEQ 10$                 ;PASS
032324  010137  047334                          MOV R1,RECDAT           ;GET CME CONTENTS RECEIVED

032330  104000                                  ERROR                           ;ERROR
                                                                                ;-----
032332  032330                                  .-2
                                                                        ;PARITY ERROR CHECK TESTS
                                                                        ;WRITING TO CME DID NOT LEAVE ALL PARITY ERROR BITS
032334  047334                                  RECDAT                  ;PRINT CME CONTENTS RECEIVED
032336  000000                                  0
                                ;;;
032340  000240                          10$:    NOP             ;END OF TEST


                                T170:           INC $TESTN              ;UPDATE TEST ID
                                ;;*************************************************************
                                .SBTTL
                                .SBTTL TEST 170
```

```
                                .SBTTL
                                .SBTTL
                                .SBTTL  VERIFY THAT CME CAN SHOW NO PARITY ERRORS FOLOWING A READ HIT
                                .SBTTL  CONDITION
                                .SBTTL  VERIFY TAG/DATA 'PARITY CHECK PARITY GENERATORS' WITH ALL 0'S
                                .SBTTL  ON THEIR INPUTS.
                                .SBTTL
                                ;;;             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
                                ;;;
                                ;;**************************************************************************

6202 032346  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     032350  032360                             40$                     ;TEST START LOCATION
     032352  070016                             1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     032354  000000                             0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     032356  070072                             25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     032360  012737  001015  177746      40$:   MOV #OFF,CCR            ;DISABLE CACHE
     032366  004437  002352                     JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     032372  032542                             10$+2                   ;ADDRESS OF START OF NEXT TEST

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

6203 032374  052737  000400  177746             BIS #FC,CCR             ;FLUSH CACHE TO INVALIDATE ALL CACHE LOCATIONS
6204 032402  032737  010000  177746             BIT #VCIP,CCR           ;WAIT TILL DONE
6205 032410  001374                             BNE .-6
6206 032412  005037  000000              1$:    CLR 0                   ;0'S TO MAIN MEMORY LOCATION 0
6207 032416  112737  000002  177750             MOVB #HODO,CMR          ;HODO ALLOWS CLOCKING OF PARITY INFO TO
6208                                            ;CME ONLY DURING THE DESTINATION ACCESS OF
6209                                            ;OF AN INSTRUCTION
6210 032424  012737  000015  177746             MOV #15,CCR             ;NO UCB SO AS TO WRITE CACHE STORES
6211 032432  005737  040000                     TST 40000               ;
6212 032436  005737  000000                     TST 0                   ;READ UPDATE TO CACHE LOCATION 0000-
6213                                            ;ALL 0'S WILL BE WRITTEN INTO DATA/TAG STORES
6214                                            ;AND A 0 INTO DATA/TAG PARITY STORES
6215 032442  005037  177744                     CLR CME                 ;CLEAR CME
6216 032446  005737  000000                     TST 0                   ;READ HIT-ALL 0'S WILL BE PLACED ON INPUTS
6217                                            ;OF DATA/TAG PARITY DETECT PARITY GENERATORS
6218                                            ;AND ALL PARITY INFO WILL BE CLOCKED
6219                                            ;TO CME
6220 032452  052737  000200  177746             BIS #PEA,CCR            ;SET CCR<7> SO AS TO ENABLE CME<7>,<6>,<5> TO
6221                                            ;TO BE WRITTEN INDIVIDUALLY FROM
6222                                            ;PARITY INFO LOGIC,AND TO WRITE  CME<15>.
6223 032460  000240                             NOP
6224 032462  013701  177744                     MOV CME,R1              ;SAVE CME CONTENTS
6225
     032466  000240                     25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     032470  000240                             NOP                     ;FOR  LOOP ON ERROR

6226 032472  012737  001015  177746             MOV #OFF,CCR            ;DISABLE CACHE
6227 032500  105037  177750                     CLRB CMR                ;DISABLE MAINTENANCE MODE
6228 032504  012737  000002  000000             MOV #2,0                ;RESTORE LOCATION 0
```

```
6229 032512  005701                          TST R1                  ;WERE ALL PARITY ERROR BITS IN CME=0?
6230 032514  001411                          BEQ 10$                 ;PASS;NEXT TEST
6231
6232 032516  005037  047320                 CLR EXDAT6              ;SPECIFY CME CONTENTS EXPECTED
6233 032522  010137  047334                 MOV R1,RECDAT           ;GET CME CONTENTS RECEIVED
6234
6235
     032526  104000                          ERROR                           ;ERROR
                                                                             ;-----
     032530  032526                          .-2
6236                                                                 ;PARITY CHECK TESTS
6237                                                                 ;ALL PARITY ERROR BITS IN CME SHOULD HAVE READ 0
6238 032532  047320                          EXDAT6                  ;PRINT EXPECTED CME CONTENTS
6239 032534  047334                          RECDAT                  ;PRINT CONTENTS OF CME RECEIVED
6240
6241 032536  000000                          0
6242                                ;;;
6243 032540  000240                10$:      NOP             ;END OF TEST
6244
6245
6246
```

```
                                T171:           INC $TESTN              ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 171
                                .SBTTL
                                .SBTTL
                                .SBTTL  VERIFY THE FOLLOWING  WHEN A LOCATION PREVIOUSLY WRITTEN
                                .SBTTL  WITH WRONG TAG PARITY IS ACCESSED:
                                .SBTTL
                                .SBTTL          1. A PARITY ERROR IS DETECTED AND ALL PARITY ERROR BITS IN
                                .SBTTL             CME READ CORRECTLY WITH PEA CLEARED,
                                .SBTTL          2.  ALL PARITY ERROR ERROR BITS READ CORRECTLY WITH PEA
                                .SBTTL             SET.
                                .SBTTL          3.  A WRITE TO CME CLEARS CME<15> AND <5> FROM A 1 STATE
                                .SBTTL
                                ;;;             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
                                ;;;
                                ;;*****************************************************************

032546  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
032550  032560                                  40$                     ;TEST START LOCATION
032552  070016                                  1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
032554  000000                                  0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
032556  070126                                  25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
032560  012737  001015  177746          40$:    MOV #OFF,CCR            ;DISABLE CACHE
032566  004437  002352                          JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
032572  033100                                  10$+2                   ;ADDRESS OF START OF NEXT TEST

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

032574  052737  000400  177746          2$:     BIS #FC,CCR             ;FLUSH CACHE TO INVALIDATE ALL CACHE LOCATIONS
032602  032737  010000  177746                  BIT #VCIP,CCR           ;WAIT TILL DONE
032610  001374                                  BNE .-6
032612  005037  000000                  1$:     CLR 0                   ;0'S TO MAIN MEMORY LOCATION 0.
032616  112737  000002  177750                  MOVB #HODO,CMR          ;HODO ALLOWS CLOCKING OF PARITY INFO TO
                                                                        ;CME ONLY DURING THE DESTINATION ACCESS OF
                                                                        ;AN INSTRUCTION.
032624  012737  000015  177746                  MOV #15,CCR             ;NO UCB SO AS TO WRITE CACHE STORES
032632  005737  000000                          TST 0                   ;
```

```
 6289 032636  005737  040000                        TST 40000          ;UPDATE CACHE LOCATION 0000 WITH CORRECT PARITY STOR
 6290 032642  052737  002000  177746                BIS #WWPT,CCR      ;ALLOW WRITE WRONG PARITY TO TAGG PARITY STORE
 6291 032650  005737  000000                        TST 0              ;READ UPDATE TO CACHE LOCATION 0000;
 6292                                                                  ;ALL 0'S(EVEN DATA) WILL BE WRITTEN TO DATA/TAG STOR
 6293                                                                  ;0'S INTO DATA PARITY STORES,AND A 1
 6294                                                                  ;INTO TAG PARITY STORE.
 6295 032654  042737  002000  177746                BIC #WWPT,CCR      ;DISABLE WWPT
 6296 032662  005037  177744                        CLR CME            ;CLEAR CME
 6297 032666  005737  000000                        TST 0              ;READ HIT; ALL 0'S WILL BE PLACED ON INPUTS
 6298                                                                  ;OF DATA PARITY ERROR CHECK PARITY GEN'S, BUT
 6299                                                                  ;TAG PARITY CHECK GENERATOR WILL
 6300                                                                  ;SEE ODD DATA DUE TO WRONG PARITY
 6301                                                                  ;FROM PREVIOUS READ UPDATE.
 6302 032672  013700  177744                        MOV CME,R0         ;SAVE PARITY ERROR BITS WITH PEA CLEARED
 6303 032676  052737  000200  177746                BIS #PEA,CCR       ;SET CCR<7> SO AS TO WRITE CME<7>,<6>,<5> INDIVIDUAL
 6304                                                                  ;FROM PARITY CHECK LOGIC, AND TO WRITE CME<15>
 6305
 6306 032704  000240                                NOP
 6307 032706  013701  177744                        MOV CME,R1         ;SAVE CME CONTENTS AFTER PEA IS SET.
 6308                                                                  ;LOOKS LIKE EXPECTED TRAP
 6309                                                                  ;DID NOT OCCUR.
 6310 032712  005037  177744                        CLR CME            ;CLEAR CME
 6311 032716  013702  177744                        MOV CME,R2         ;SAVE CME CONTENTS AFTER CLEAR
 6312
      032722  000240                        25$:    NOP                ;INSTRUCTION 'JMP 1$' PLACED HERE
      032724  000240                                NOP                ;FOR  LOOP ON ERROR

 6313 032726  012737  001015  177746                MOV #OFF,CCR       ;DISABLE CACHE
 6314 032734  105037  177750                        CLRB CMR           ;DISABLE MAINT. MODE
 6315 032740  012737  000002  000000                MOV #2,0           ;RESTORE LOCATION 0
 6316 032746  052737  000400  177746                BIS #FC,CCR        ;BEFORE LEAVING TEST,FLUSH CACHE TO
 6317                                                                  ;ELIMINATE ANY EFFECTS OF WWPT
 6318 032754  032737  010000  177746                BIT #VCIP,CCR      ;WAIT TILL DONE
 6319 032762  001374                                BNE .-6
 6320 032764  022700  000340                        CMP #340,R0        ;WERE PARITY ERROR BITS CORRECT IN CME
 6321                                                                  ;WITH PEA CLEARED?
 6322 032770  001412                                BEQ 7$             ;YES
 6323 032772  012737  000340  047320                MOV #340,EXDAT6    ;SPECIFY CME CONTENTS EXPECTED
 6324 033000  010037  047334                        MOV R0,RECDAT      ;GET CME CONTENTS RECEIVED
 6325
      033004  104000                                ERROR                      ;ERROR
                                                                               ;-----
      033006  033004                                .-2
 6326                                                                  ;PERITY CHECK TESTS
 6327                                                                  ;PARITY ERROR BITS DID NOT READ CORRECTLY
 6328                                                                  ;WITH PEA CLEARED
 6329 033010  047320                                EXDAT6             ;PRINT CME CONTENTS EXPECTED
 6330 033012  047334                                RECDAT             ;PRINT CME CONTENTS RECEIVED
 6331 033014  000000                                0
 6332                                                                           ;...
 6333 033016  022701  100040                7$:     CMP #100040,R1     ;WERE PARITY ERROR BITS CORRECT WITH PEA SET?
 6334 033022  001412                                BEQ 8$             ;YES
 6335 033024  012737  100040  047320                MOV #100040,EXDAT6 ;SPECIFY CME CONTENTS EXPECTED
 6336 033032  010137  047334                        MOV R1,RECDAT      ;GET CME CONTENTS RECEIVED
 6337
      033036  104000                                ERROR                      ;ERROR
                                                                               ;-----
```

```
      033040  033036                          .-2
6338                                          ;PARITY CHECK TESTS
6339                                          ;PARITY ERROR BITS DID NOT READ CORRECTLY
6340                                          ;WITH PEA SET.
6341  033042  047320                         EXDAT6                  ;PRINT CME CONTENTS EXPECTED
6342  033044  047334                         RECDAT                  ;PRINT CME CONTENTS RECEIVED
6343  033046  000000                         0
6344                                                                  ;;;
6345  033050  005702                  8$:    TST R2                  ;DID CME CLEAR?
6346  033052  001411                         BEQ 10$                 ;YES
6347  033054  005037  047320                 CLR EXDAT6              ;SPECIFY CME CONTENTS EXPECTED
6348  033060  010237  047334                 MOV R2,RECDAT           ;GET CME CONTENTS RECEIVED
6349
      033064  104000                         ERROR                           ;ERROR
                                                                             ;-----
      033066  033064                          .-2
6350                                          ;PARITY CHECK TESTS
6351                                          ;PARITY ERROR BITS DID NOT CLEAR
6352                                          ;FOLLOWING WRITE TO CME
6353  033070  047320                         EXDAT6                  ;PRINT CME CONTENTS EXPECTED
6354  033072  047334                         RECDAT                  ;PRINT CME CONTENTS RECEIVED
6355  033074  000000                         0
6356                                                                  ;;;
6357  033076  000240                  10$:    NOP             ;END OF TEST
6358
6359
6360
6361  033100  005237  001464          T172:  INC $TESTN              ;UPDATE TEST ID
                                      ;;*****************************************************************
                                      .SBTTL
                                      .SBTTL TEST 172
                                      .SBTTL
6362                                  .SBTTL
6363                                  .SBTTL  VERIFY THE FOLLOWING  WHEN A LOCATION PREVIOUSLY WRITTEN
6364                                  .SBTTL  WITH WRONG LO & HI BYTE PARITY IS ACCESSED.
6365                                  .SBTTL
6366                                  .SBTTL          1. A PARITY ERROR IS DETECTED AND ALL PARITY ERROR BITS IN
6367                                  .SBTTL             CME READ CORRECTLY WITH PEA CLEARED.
6368                                  .SBTTL          2.  ALL PARITY ERROR BITS READ CORRECTLY WITH PEA
6369                                  .SBTTL             SET.
6370                                  .SBTTL          3.  A WRITE TO CME CLEARS CME<15> ,<7> AND <6> FROM A 1 STATE
6371                                  .SBTTL
6372                                  ;;;             PROCEDURE:      WRITE WRONG PARITY TO LO BYTE PARITY STORE LOCATION
6373                                  ;;;                             0000. CLOCK PARITY INFO. TO CME.
6374                                  ;;;
6375                                  ;;;             CONDITIONS:     HI BYTE PARITY CHECK PARITY GEN. INPUTS:
6376                                  ;;;                               INTD<15:8>=0
6377                                  ;;;                               HI BYTE PARITY BIT=1
6378                                  ;;;                             LO BYTE PAR. CHECK PAR. GEN INPUTS:
6379                                  ;;;                               INTD<7:0>= ALL 0'S
6380                                  ;;;                               LO BYTE PARITY BIT=1
6381                                  ;;;                             TAG PARITY CHECK PARITY GEN. INPUTS:
6382                                  ;;;                               ALL 0'S
6383                                  ;;;
6384                                  ;;;             RESULTS:        PEA CLEARED:
6385                                  ;;;                               CME<15>=0
6386                                  ;;;                               CME<7>,<6>,<5>=1
```

```
6387                                    ;;;                                 PEA SET:
6388                                    ;;;                                   CME<15>=1
6389                                    ;;;                                   CME<7>,<6>=1
6390                                    ;;;                                   CME<5>=0
6391                                    ;;;
6392                                    ;;;*****************************************************************
6393
6394 033104  000004                                   SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                               ;ERROR/LOOP ON TEST
      033106  033116                                   40$                     ;TEST START LOCATION
      033110  070016                                   1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
      033112  000000                                   0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      033114  070126                                   25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
      033116  012737  001015  177746           40$:    MOV #OFF,CCR            ;DISABLE CACHE
      033124  004437  002352                           JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
      033130  033436                                   10$+2                   ;ADDRESS OF START OF NEXT TEST

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

6395 033132  052737  000400  177746                   BIS #FC,CCR             ;FLUSH CACHE TO INVALIDATE ALL CACHE LOCATIONS
6396 033140  032737  010000  177746                   BIT #VCIP,CCR           ;WAIT TILL DONE
6397 033146  001374                                   BNE .-6
6398 033150  005037  000000                   1$:     CLR 0                   ;0'S TO MAIN MEMORY LOCATION 0.
6399
6400 033154  112737  000002  177750                   MOVB #HODO,CMR          ;HODO ALLOWS CLOCKING OF PARITY INFO TO
6401                                                                           ;CME ONLY DURING THE DESTINATION ACCESS OF
6402                                                                           ;AN INSTRUCTION.
6403 033162  012737  000015  177746                   MOV #15,CCR             ;NO UCB SO AS TO WRITE CACHE STORES
6404 033170  005737  000000                           TST 0                   ;
6405 033174  005737  040000                           TST 40000               ;UPDATE CACHE LOCATION 0000 WITH CORRECT PARITY STOR
6406 033200  052737  000100  177746                   BIS #WWPD,CCR           ;ALLOW WRITE WRONG PARITY DATA TO LO
6407                                                                           ;& HI BYTE PARITY STORE.
6408 033206  005737  000000                           TST 0                   ;READ UPDATE TO CACHE LOCATION 0000;
6409                                                                           ;ALL 0'S WILL BE WRITTEN TO DATA/TAG STORES,
6410                                                                           ;1'S INTO LO & HI BYTE DATA PARITY STORES,AND A 0
6411                                                                           ;INTO TAG PARITY STORE.
6412 033212  042737  000100  177746                   BIC #WWPD,CCR           ;DISABLE WWPD
6413 033220  005037  177744                           CLR CME                 ;CLEAR CME
6414 033224  005737  000000                           TST 0                   ;READ HIT; ALL 0'S(EVEN DATA) WILL BE
6415                                                                           ;PLACED ON INPUTS
6416                                                                           ;OF TAG PARITY ERROR CHECK PARITY GEN'S, BUT
6417                                                                           ;LO & HI BYTE PARITY CHECK GENERATORS WILL
6418                                                                           ;SEE ODD DATA DUE TO WRONG PARITY
6419                                                                           ;FROM PREVIOUS READ UPDATE.
6420 033230  013700  177744                           MOV CME,R0              ;SAVE PARITY ERROR BITS WITH PEA CLEARED
6421 033234  052737  000200  177746                   BIS #PEA,CCR            ;SET CCR<7> SO AS TO WRITE CME<7>,<6>,<5> INDIVIDUAL
6422                                                                           ;FROM PARITY CHECK LOGIC, AND TO WRITE CME<15>
6423
6424 033242  000240                                   NOP
6425 033244  013701  177744                           MOV CME,R1              ;SAVE CME CONTENTS AFTER PEA IS SET.
6426                                                                           ;LOOKS LIKE EXPECTED TRAP
6427                                                                           ;DID NOT OCCUR.
6428 033250  005037  177744                           CLR CME                 ;CLEAR CME
6429 033254  013702  177744                           MOV CME,R2              ;SAVE CME CONTENTS AFTER CLEAR
6430
      033260  000240                           25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
```

```
                033262  000240                          NOP                     ;FOR  LOOP ON ERROR

 6431 033264  012737  001015  177746                    MOV #OFF,CCR            ;DISABLE CACHE
 6432 033272  105037  177750                            CLRB CMR                ;DISABLE MAINT. MODE
 6433 033276  012737  000002  000000                    MOV #2,0                ;RESTORE LOCATION 0
 6434 033304  052737  000400  177746                    BIS #FC,CCR             ;BEFORE LEAVING TEST FLUSH CACHE TO
 6435                                                                          ;ELIMINATE ANY EFFECTS OF WWPD
 6436 033312  032737  010000  177746                    BIT #VCIP,CCR           ;WAIT TILL DONE
 6437 033320  001374                                    BNE .-6
 6438 033322  022700  000340                            CMP #340,R0             ;WERE PARITY ERROR BITS CORRECT IN CME
 6439                                                                          ;WITH PEA CLEARED?
 6440 033326  001412                                    BEQ 7$                  ;YES
 6441 033330  012737  000340  047320                    MOV #340,EXDAT6         ;SPECIFY CME CONTENTS EXPECTED
 6442 033336  010037  047334                            MOV R0,RECDAT           ;GET CME CONTENTS RECEIVED
 6443
                033342  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                033344  033342                          .-2
 6444                                                                         ;PERITY CHECK TESTS
 6445                                                                         ;PARITY ERROR BITS DID NOT READ CORRECTLY
 6446                                                                         ;WITH PEA CLEARED
 6447 033346  047320                                    EXDAT6                  ;PRINT CME CONTENTS EXPECTED
 6448 033350  047334                                    RECDAT                  ;PRINT CME CONTENTS RECEIVED
 6449 033352  000000                                    0
 6450                                                                                    ;;;
 6451 033354  022701  100300                    7$:     CMP #100300,R1          ;WERE PARITY ERROR BITS CORRECT WITH PEA SET?
 6452 033360  001412                                    BEQ 8$                  ;YES
 6453 033362  012737  100300  047320                    MOV #100300,EXDAT6      ;SPECIFY CME CONTENTS EXPECTED
 6454 033370  010137  047334                            MOV R1,RECDAT           ;GET CME CONTENTS RECEIVED
 6455
                033374  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                033376  033374                          .-2
 6456                                                                         ;PARITY CHECK TESTS
 6457                                                                         ;PARITY ERROR BITS DID NOT READ CORRECTLY
 6458                                                                         ;WITH PEA SET.
 6459 033400  047320                                    EXDAT6                  ;PRINT CME CONTENTS EXPECTED
 6460 033402  047334                                    RECDAT                  ;PRINT CME CONTENTS RECEIVED
 6461 033404  000000                                    0
 6462                                                                                    ;;;
 6463 033406  005702                    8$:     TST R2                  ;DID CME CLEAR?
 6464 033410  001411                            BEQ 10$                 ;YES
 6465 033412  005037  047320                    CLR EXDAT6              ;SPECIFY CME CONTENTS EXPECTED
 6466 033416  010237  047334                    MOV R2,RECDAT           ;GET CME CONTENTS RECEIVED
 6467
                033422  104000                  ERROR                           ;ERROR
                                                                                ;-----
                033424  033422                  .-2
 6468                                                                 ;PARITY CHECK TESTS
 6469                                                                 ;PARITY ERROR BITS DID NOT CLEAR
 6470                                                                 ;FOLLOWING WRITE TO CME
 6471 033426  047320                            EXDAT6                  ;PRINT CME CONTENTS EXPECTED
 6472 033430  047334                            RECDAT                  ;PRINT CME CONTENTS RECEIVED
 6473 033432  000000                            0
 6474                                                                            ;;;
 6475 033434  000240                    10$:    NOP             ;END OF TEST
 6476
```

```
6477
6478
6479
```

```
                                .SBTTL *
                                .SBTTL
                                .SBTTL *                INTERRUPT/ABORT LOGIC TESTS
                                .SBTTL                 ----------------------------
                                .SBTTL
                                .SBTTL *


033436  005237  001464       T173:           INC $TESTN              ;UPDATE TEST ID
                              ;;*****************************************************************
                              .SBTTL
                              .SBTTL TEST 173
                              .SBTTL
                              .SBTTL
                              .SBTTL  VERIFY INTERRUPT LOGIC BY ASSURING THAT A TRAP OCCURS TO LOCATION
                              .SBTTL  114 WHEN A LOCATION PREVIOUSLY WRITTEN
                              .SBTTL  WITH WRONG HI/LO BYTE PARITY IS ACCESSED.
                              .SBTTL
                              ;;;
                              ;;;             CONDITIONS:     PEA=0
                              ;;;                             DCPI=0
                              ;;;
                              ;;*****************************************************************
033442  000004                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                      ;ERROR/LOOP ON TEST
033444  033454                                40$                     ;TEST START LOCATION
033446  070016                                1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
033450  000000                                0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
033452  070152                                25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
033454  012737  001015  177746       40$:     MOV #OFF,CCR            ;DISABLE CACHE
033462  004437  002352                        JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
033466  033726                                10$+2                   ;ADDRESS OF START OF NEXT TEST

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

033470  052737  000400  177746                BIS #FC,CCR             ;FLUSH CACHE TO INVALIDATE ALL CACHE LOCATIONS
033476  032737  010000  177746                BIT #VCIP,CCR           ;WAIT TILL DONE
033504  001374                                BNE .-6
033506  005037  000000           1$:          CLR 0                   ;0'S TO MAIN MEMORY LOCATION 0.
033512  012737  070142  000114                MOV #4$-40$+67764,114           ;SETUP FOR CACHE TRAP
033520  012737  000340  000116                MOV #340,116

033526  112737  000002  177750                MOVB #HODO,CMR          ;HODO ALLOWS CACHE UPDATES
                                                                      ;AND CLOCKING OF PARITY INFO TO INTERRUPT LOGIC
                                                                      ; ONLY DURING THE DESTINATION ACCESS OF
                                                                      ;AN INSTRUCTION.
033534  005037  002060                        CLR FAIL1               ;CLEAR ERROR FLAG
033540  012737  000015  177746                MOV #15,CCR             ;NO UCB SO AS TO WRITE CACHE STORES
033546  005737  000000                        TST 0                   ;
033552  005737  040000                        TST 40000               ;UPDATE CACHE LOCATION 0000 WITH CORRECT PARITY STOR
033556  052737  000100  177746                BIS #WWPD,CCR           ;ALLOW WRITE WRONG PARITY DATA TO LO
                                                                      ;& HI BYTE PARITY STORE.
033564  005737  000000                        TST 0                   ;READ UPDATE TO CACHE LOCATION 0000;
```

```
6522
6523 033570  042737  000100  177746          BIC #WWPD,CCR          ;WRITE WRONG PARITY TO HI/LO BYTE PARITY STORES
6524 033576  005037  177744                  CLR CME                ;DISABLE WWPD
6525 033602  042737  000005  177746          BIC #DCPI+FMLO,CCR     ;CLEAR CME AND PARITY DETECT LOGIC
6526                                                                ;ALLOW FOR INTERRUPT TO OCCUR
6527 033610  005737  000000                  TST 0                  ;AND ENABLE LOW CACHE
6528                                                                ;READ HIT;
6529                                                                ;LO & HI BYTE PARITY CHECK GENERATORS WILL
6530                                                                ; DETECT  WRONG PARITY AND THE PARITY
6531                                                                ;ERROR WILL BE CLOCKED TO INTERRUPT
6532 033614  000240                          NOP                    ;LOGIC
6533 033616  005237  002060                  INC FAIL1              ;INDICATE THAT TRAP DID NOT OCCUR
6534 033622  012737  001015  177746          MOV #OFF,CCR           ;DISABLE CACHE
6535 033630  000404                          BR 25$
6536 033632  012737  001015  177746  4$:     MOV #OFF,CCR           ;DISABLE CACHE
6537 033640  022626                          CMP (SP)+,(SP)+        ;READJUST STACK DUE TO INTERRUPT
6538
     033642  000240                  25$:    NOP                    ;INSTRUCTION 'JMP 1$' PLACED HERE
     033644  000240                          NOP                    ;FOR  LOOP ON ERROR

6539 033646  105037  177750                  CLRB CMR               ;DISABLE MAINT. MODE
6540 033652  012737  000002  000000          MOV #2,0               ;RESTORE LOCATION 0
6541 033660  012737  000116  000114          MOV #116,114           ;RESTORE CACHE INTERRUPT VECTORS
6542 033666  005037  000116                  CLR 116
6543 033672  052737  000400  177746          BIS #FC,CCR            ;BEFORE LEAVING TEST FLUSH CACHE TO
6544                                                                ;ELIMINATE ANY EFFECTS OF WWPD
6545 033700  032737  010000  177746          BIT #VCIP,CCR          ;WAIT TILL DONE
6546 033706  001374                          BNE .-6
6547 033710  005737  002060                  TST FAIL1              ;DID TRAP OCCUR?
6548 033714  001403                          BEQ 10$                ;YES
6549
     033716  104000                          ERROR                          ;ERROR
                                                                            ;-----
     033720  033716                          .-2
6550                                                                ;INTERRUPT/ABORT LOGIC TESTS
6551                                                                ;TRAP TO LOCATION 114 DID NOT OCCUR
6552 033722  000000                          0
6553                                                                ;;;
6554 033724  000240                  10$:    NOP            ;END OF TEST
6555
6556
6557
6558
6559
6560 033726  005237  001464          T174:   INC $TESTN             ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 174
                                    .SBTTL
6561                                .SBTTL
6562                                .SBTTL  VERIFY INTERRUPT LOGIC BY ASSURING THAT A TRAP CAN BE INHIBITED TO LOCATION
6563                                .SBTTL  114 WHEN A LOCATION PREVIOUSLY WRITTEN
6564                                .SBTTL  WITH WRONG HI/LO BYTE PARITY IS ACCESSED.
6565                                .SBTTL
6566                                ;;;
6567                                ;;;             CONDITIONS:     PEA=0
6568                                ;;;                             DCPI=1
```

```
6569                                    ;;;
6570                                    ;;**********************************************************************
6571 033732  000004                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                            ;ERROR/LOOP ON TEST
     033734  033744                                 40$                     ;TEST START LOCATION
     033736  070016                                 1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     033740  000000                                 0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     033742  070152                                 25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     033744  012737  001015  177746          40$:   MOV #OFF,CCR            ;DISABLE CACHE
     033752  004437  002352                         JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     033756  034216                                 10$+2                   ;ADDRESS OF START OF NEXT TEST

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

6572 033760  052737  000400  177746              BIS #FC,CCR               ;FLUSH CACHE TO INVALIDATE ALL CACHE LOCATIONS
6573 033766  032737  010000  177746              BIT #VCIP,CCR             ;WAIT TILL DONE
6574 033774  001374                             BNE .-6
6575 033776  005037  000000                1$:  CLR 0                     ;0'S TO MAIN MEMORY LOCATION 0.
6576
6577 034002  012737  070136  000114              MOV #4$-40$+67764,114             ;SETUP FOR CACHE TRAP
6578 034010  012737  000340  000116              MOV #340,116
6579 034016  112737  000002  177750              MOVB #HODO,CMR            ;HODO ALLOWS CACHE UPDATES
6580                                            ;AND CLOCKING OF PARITY INFO TO INTERRUPT LOGIC
6581                                            ; ONLY DURING THE DESTINATION ACCESS OF
6582                                            ;AN INSTRUCTION.
6583 034024  005037  002060                     CLR FAIL1                 ;CLEAR ERROR FLAG
6584 034030  012737  000015  177746              MOV #15,CCR               ;NO UCB SO AS TO WRITE CACHE STORES
6585 034036  005737  000000                     TST 0                     ;
6586 034042  005737  040000                     TST 40000                 ;UPDATE CACHE LOCATION 0000 WITH CORRECT PARITY STOR
6587 034046  052737  000100  177746              BIS #WWPD,CCR             ;ALLOW WRITE WRONG PARITY DATA TO LO
6588                                            ;& HI BYTE PARITY STORE.
6589 034054  005737  000000                     TST 0                     ;READ UPDATE TO CACHE LOCATION 0000;
6590                                            ;WRITE WRONG PARITY TO HI/LO BYTE PARITY STORES
6591 034060  042737  000100  177746              BIC #WWPD,CCR             ;DISABLE WWPD
6592 034066  005037  177744                     CLR CME                   ;CLEAR CME AND PARITY DETECT LOGIC
6593 034072  042737  000004  177746              BIC #FMLO,CCR             ;ENABLE LO CACHE
6594 034100  005737  000000                     TST 0                     ;READ HIT;
6595                                            ;LO & HI BYTE PARITY CHECK GENERATORS WILL
6596                                            ; DETECT  WRONG PARITY AND THE PARITY
6597                                            ;ERROR WILL BE CLOCKED TO INTERRUPT
6598                                            ;LOGIC
6599 034104  000240                             NOP
6600 034106  012737  001015  177746              MOV #OFF,CCR              ;DISABLE CACHE
6601 034114  000406                             BR 25$
6602 034116  012737  001015  177746        4$:   MOV #OFF,CCR              ;DISABLE CACHE
6603 034124  005237  002060                     INC FAIL1                 ;INDICATE THAT TRAP OCCURED
6604 034130  022626                             CMP (SP)+,(SP)+           ;READJUST STACK DUE TO INTERRUPT
6605
     034132  000240                       25$:  NOP                       ;INSTRUCTION 'JMP 1$' PLACED HERE
     034134  000240                             NOP                       ;FOR  LOOP ON ERROR

6606 034136  105037  177750                     CLRB CMR                  ;DISABLE MAINT. MODE
6607 034142  012737  000002  000000              MOV #2,0                  ;RESTORE LOCATION 0
6608 034150  012737  000116  000114              MOV #116,114              ;RESTORE CACHE INTERRUPT VECTORS
6609 034156  005037  000116                     CLR 116
6610 034162  052737  000400  177746              BIS #FC,CCR               ;BEFORE LEAVING TEST FLUSH CACHE TO
```

```
6611                                                    ;ELIMINATE ANY EFFECTS OF WWPD
6612 034170  032737  010000  177746          BIT #VCIP,CCR          ;WAIT TILL DONE
6613 034176  001374                          BNE .-6
6614 034200  005737  002060                  TST FAIL1              ;DID TRAP OCCUR?
6615 034204  001403                          BEQ 10$                ;NO
6616
     034206  104000                          ERROR                          ;ERROR
                                                                             ;-----
     034210  034206                          .-2
6617                                                    ;INTERRUPT/ABORT LOGIC TESTS
6618                                                    ;TRAP TO LOCATION 114  OCCURED
6619                                                    ;AND WAS NOT INHIBITED BY DCPI
6620
6621 034212  000000                          0
6622                                                                    ;;;
6623 034214  000240                  10$:    NOP             ;END OF TEST
6624
6625
6626
6627
6628 034216  005237  001464          T175:   INC $TESTN              ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 175
                                    .SBTTL
6629                                .SBTTL
6630                                .SBTTL  VERIFY ABORT LOGIC BY THE FOLLOWING RESULTS WHEN A LOCATION
6631                                .SBTTL  PREVIOUSLY WRITTEN WITH WRONG HI/LO BYTE PARITY IS ACCESSED.
6632                                .SBTTL          1. CME<15> WILL SET CAUSED BY ABORT SIGNAL BEING ASSERTED
6633                                .SBTTL          2. WRITE TO CME WILL CLEAR CME<15>
6634                                .SBTTL          3. INSTRUCTION CYCLE WILL BE ABORTED
6635                                .SBTTL          4. THE ABORT CAUSES TRAP TO 114
6636                                .SBTTL
6637                                ;;;             PROCEDURE:      INHIBIT CLOCKING OF PARITY ERROR SIGNAL TO
6638                                ;;;                             INTERRUPT LOGIC. ALLOW CME<15> TO BE SET
6639                                ;;;                             BY ABORT SIGNAL WHICH IS ASSERTED BY PARITY
6640                                ;;;                             ERROR SIGNAL TO ABORT LOGIC.
6641
6642                                ;;;
6643                                ;;;             CONDITIONS:     PEA=1
6644                                ;;;                             DCPI=1
6645                                ;;;
6646                                ;;*****************************************************************
6647 034222  000004                          SCPCND                 ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     034224  034234                          40$                    ;TEST START LOCATION
     034226  070016                          1$-40$+70000-14        ;LOOP ON ERROR START LOCATION
     034230  000000                          0                      ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     034232  070174                          25$-40$+70000-14       ;LOOP ON ERROR END LOCATION
     034234  012737  001015  177746  40$:    MOV #OFF,CCR           ;DISABLE CACHE
     034242  004437  002352                  JSR R4,RELCTH          ;LOCATE TEST CODE TO HIGH CACHE SPACE
     034246  034574                          10$+2                  ;ADDRESS OF START OF NEXT TEST

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

6648 034250  052737  000400  177746          BIS #FC,CCR            ;FLUSH CACHE TO INVALIDATE ALL CACHE LOCATIONS
```

```
6649 034256  032737  010000  177746          BIT #VCIP,CCR          ;WAIT TILL DONE
6650 034264  001374                          BNE .-6
6651 034266  005037  000000            1$:   CLR 0                  ;ALL 0'S TO LOCATION 0
6652 034272  005000                          CLR R0                 ;ADDRESS 0 TO R0
6653 034274  012737  070150  000114          MOV #4$-40$+67764,114  ;SETUP FOR TRAP
6654 034302  012737  000340  000116          MOV #340,116
6655
6656 034310  112737  000002  177750          MOVB #HODO,CMR         ;HODO ALLOWS CACHE UPDATES
6657                                          ;AND CLOCKING OF PARITY INFO TO INTERRUPT LOGIC
6658                                          ; ONLY DURING THE DESTINATION ACCESS OF
6659                                          ;AN INSTRUCTION.
6660 034316  005037  002060                   CLR FAIL1              ;CLEAR ERROR FLAG
6661 034322  012703  177777                   MOV #-1,R3             ;ALL 1'S TO R3
6662 034326  012737  000015  177746          MOV #15,CCR            ;NO UCB SO AS TO WRITE CACHE STORES
6663 034334  005710                          TST (R0)               ;
6664 034336  005737  040000                   TST 40000              ;UPDATE CACHE LOCATION 0000 WITH CORRECT PARITY STOR
6665 034342  052737  000100  177746          BIS #WWPD,CCR          ;ALLOW WRITE WRONG PARITY DATA TO LO
6666                                          ;& HI BYTE PARITY STORE.
6667 034350  005710                          TST (R0)               ;READ UPDATE TO CACHE LOCATION 0000
6668                                          ;WRITE WRONG PARITY TO HI/LO BYTE PARITY STORES
6669 034352  042737  000100  177746          BIC #WWPD,CCR          ;DISABLE WWPD
6670 034360  005037  177744                   CLR CME                ;CLEAR CME AND PARITY DETECT LOGIC
6671 034364  042737  000004  177746          BIC #FMLO,CCR          ; ENABLE LOW CACHE
6672 034372  052737  000200  177746          BIS #PEA,CCR           ;ALLOW FOR ABORT
6673 034400  011003                          MOV (R0),R3            ;READ HIT;
6674                                          ;LO & HI BYTE PARITY CHECK GENERATORS WILL
6675                                          ; DETECT  WRONG PARITY
6676                                          ;USING HODO AND SOURCE MODE FOR READING
6677                                          ;LOCATION 0 WILL INHIBIT PARITY ERROR
6678                                          ;FROM BEING CLOCKED TO INTERRUPT LOGIC
6679                                          ;HOWEVER, THE PARITY ERROR SIGNAL
6680                                          ;WILL CAUSE THE ABORT SIGNAL TO BE
6681                                          ;ASSERTED.THE ABORT SIGNAL WILL BE
6682                                          ;CAUSE CME<15> TO BE SET.
6683                                          ;THIS INSTRUCTION SHOULD BE ABORTED
6684 034402  000240                          NOP
6685 034404  005237  002060                   INC FAIL1              ;INDICATE NO TRAP OCCURED
6686 034410  012737  001015  177746          MOV #OFF,CCR           ;DISABLE CACHE
6687 034416  000404                          BR 5$
6688 034420  012737  001015  177746    4$:   MOV #OFF,CCR           ;DISABLE CACHE
6689 034426  022626                          CMP (SP)+,(SP)+        ;READJUST STACK
6690 034430  013701  177744            5$:   MOV CME,R1             ;SAVE CME CONTENTS
6691 034434  005037  177744                   CLR CME                ;WRITE TO CME
6692 034440  013702  177744                   MOV CME,R2             ;SAVE CME CONTENTS
6693
6694
     034444  000240                   25$:   NOP                    ;INSTRUCTION 'JMP 1$' PLACED HERE
     034446  000240                          NOP                    ;FOR  LOOP ON ERROR

6695 034450  105037  177750                   CLRB CMR               ;DISABLE MAINT. MODE
6696 034454  012737  000002  000000          MOV #2,@#0             ;RESTORE VECTORS
6697 034462  012737  000116  000114          MOV #116,@#114
6698 034470  005037  000116                   CLR @#116
6699 034474  052737  000400  177746          BIS #FC,CCR            ;BEFORE LEAVING TEST FLUSH CACHE TO
6700                                          ;ELIMINATE ANY EFFECTS OF WWPD
6701 034502  032737  010000  177746          BIT #VCIP,CCR          ;WAIT TILL DONE
6702 034510  001374                          BNE .-6
```

```
6703 034512  032701  100000                BIT #CMPE,R1          ;WAS CME<15> SET?
6704 034516  001003                        BNE 7$                ;YES; PASS
6705
     034520  104000                        ERROR                         ;ERROR
                                                                       ;-----
     034522  034520                        .-2
6706                                                               ;INTERRUPT/ABORT LOGIC
6707                                                               ;CME<15> WAS NOT SET DUE TO ABORT
6708                                                               ;SIGNAL
6709 034524  000000                        0
6710                                                               ;;;
6711 034526  032702  100000          7$:   BIT #CMPE,R2          ;WAS CME<15> CLEARED?
6712 034532  001403                        BEQ 8$                ;YES
6713
     034534  104000                        ERROR                         ;ERROR
                                                                       ;-----
     034536  034534                        .-2
6714                                                               ;INTERRUPT/ABORT TESTS
6715                                                               ;CME<15> WAS NOT CLEARED BY WRITE TO
6716                                                               ; TO CME
6717 034540  000000                        0
6718                                                               ;;;
6719 034542  022703  177777          8$:   CMP #-1,R3            ;WAS INSTRUCTION ABORTED LEAVING R3 INTACT?
6720 034546  001403                        BEQ 9$                ;YES
6721
     034550  104000                        ERROR                         ;ERROR
                                                                       ;-----
     034552  034550                        .-2
6722                                                               ;INTERRUPT/ABORT TESTS
6723                                                               ;R3 WAS OVERWRITTEN WITH DATA INDICATING
6724                                                               ;THAT INSTRUCTION WAS NOT ABORTED
6725 034554  000000                        0
6726 034556  005737  002060          9$:   TST FAIL1             ;DID TRAP OCCUR
6727 034562  001403                        BEQ 10$               ;YES;PASS
6728
     034564  104000                        ERROR                         ;ERROR
                                                                       ;-----
     034566  034564                        .-2
6729                                                               ;INTERRUPT/ABORT TESTS
6730                                                               ;TRAP DID NOT OCCUR DUE TO ABORT
6731 034570  000000                        0
6732                                                               ;;;
6733 034572  000240                 10$:   NOP                   ;END OF TEST
6734
6735
6736
6737
6738                                .SBTTL *
6739                                .SBTTL
6740                                .SBTTL *              CACHE TAG/DATA PARITY STORE RAM MEMORY MARCH PATTERN TEST
6741                                .SBTTL
6742                                .SBTTL *
6743
6744
6745
6746 034574  005237  001464        T176:   INC $TESTN            ;UPDATE TEST ID
                                    ;;**********************************************************
```

```
                                .SBTTL
                                .SBTTL TEST 176
                                .SBTTL
                                .SBTTL
                                .SBTTL  VERIFY CACHE TAG/DATA PARITY STORE RAM MEMORY IC'S BY PERFORMING A
                                .SBTTL  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.
                                ;;;
                                ;;;*****************************************************************
034600  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
034602  034612                          40$                     ;TEST START LOCATION
034604  070000                          1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
034606  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
034610  070126                          25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
034612  012737  001015  177746  40$:    MOV #OFF,CCR            ;DISABLE CACHE
034620  004437  002352                  JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
034624  035226                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

034626  012702  000401          1$:     MOV #401,R2             ;SETUP R2 WITH PATTERN 401
034632  005037  177752                  CLR CHR                 ;LOAD AMR<8:0> WITH ALL 0'S
034636  012700  060000                  MOV #60000,R0           ;ADDRESS 60000 TO R0
034642  005020                  2$:     CLR (R0)+               ;CLEAR ALL LOW CACHE MAIN MEMORY
034644  020027  070000                  CMP R0,#70000
034650  001374                          BNE 2$
034652  012700  060000                  MOV #60000,R0           ;1ST ADDRESS LOCATION IN R0
034656  012701  040000                  MOV #40000,R1           ;ADDRESS 40000 IN R1
034662  112737  000003  177750          MOVB #HODO+TDAR,CMR     ;HODO ALLOWS CACHE UPDATES &  DATA /TAG PARITY
                                                                ; STORE BITS TO BE WRITTEN TO
                                                                ;CMR<11:9> ONLY DURING THE  DESTINATION
                                                                ;ACCESS OF AN INSTRUCTION.
                                                                ;TDAR ALLOWS TAG PARITY STORE GENERATOR
                                                                ;INPUTS TO BE LOADED FROM AMR<8:0>
034670  012737  000015  177746          MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE PARITY
                                                                ;STORE
034676  005721                  6$:     TST (R1)+               ;
034700  005720                          TST (R0)+               ;WRITE 0'S INTO ALL DATA/TAG PARITY STORE
                                                                ;ADDRESS LOCATIONS SPECIFIED BY R0
034702  022700  070000                  CMP #70000,R0           ;DONE?
034706  001373                          BNE 6$                  ;NO

034710  012737  000001  177752          MOV #1,CHR              ;LOAD AMR<8:0> BY WRITING TO CHR<8:0>
034716  012700  060000                  MOV #60000,R0           ;ADDR. 60000 TO R0
034722  042737  000001  177750  7$:     BIC #TDAR,CMR           ;DISABLE TDAR TO ALLOW UPDATE
                                                                ;OF CACHE TAG STORE THRU CA<21:13>
```

```
6789 034730  005710                          TST (R0)            ;READ MISS TO CACHE LOCATION SPECIFIED
6790                                                             ;BY R0.  CLOCK TAG/DATA PARITY STORE
6791                                                             ;BITS INTO CMR<11:9>.SHOULD BE ALL 0'S.
6792                                                             ;ALSO CAUSES UPDATE TO CACHE.TAG/DATA
6793                                                             ;PARITY STORE LOCATION SHOULD REMAIN
6794                                                             ;WITH 0'S.
6795 034732  013705  177750                MOV CMR,R5          ;SAVE CMR CONTENTS
6796 034736  052737  000001  177750        BIS #TDAR,CMR       ;ENABLE TDAR TO ALLOW TAG PARITY GENERATOR
6797                                                             ;INPUTS TO SEE ODD DATA FROM AMR<8:0>
6798 034744  010210                        MOV R2,(R0)         ;WRITE HIT CAUSES UPDATE TO CACHE.
6799                                                             ;TAG/DATA PARITY STORES WILL BE WRITTEN
6800                                                             ;WITH 1'S DUE TO AMR<8:0> ODD DATA
6801                                                             ;AND PATTERN 401 FROM R2 BEING PUT
6802                                                             ;ONTO PAX DATA LINES RESULTING IN
6803                                                             ;ODD DATA FOR LO AND HI BYTE DATA PARITY
6804                                                             ;GENERATORS.
6805
6806 034746  005710                          TST (R0)            ;READ MISS.CLOCK TAG/DATA PARITY STORE BITS TO
6807                                                             ;CMR<11:9>.SHOULD BE ALL 1'S.
6808 034750  013703  177750                MOV CMR,R3          ;SAVE CMR CONTENTS
6809
     034754  000240                  25$:   NOP                 ;INSTRUCTION 'JMP 1$' PLACED HERE
     034756  000240                         NOP                 ;FOR  LOOP ON ERROR

6810
6811 034760  042705  170777                BIC #170777,R5      ;INTERESTED IN BITS 11:9
6812 034764  005705                        TST R5              ;BITS 11:9 SHOULD BE ALL 0'S
6813 034766  001437                        BEQ 8$              ;PASS
6814
6815 034770  012737  001015  177746        MOV #OFF,CCR        ;DISABLE CACHE
6816 034776  105037  177750                CLRB CMR            ;CLEAR MAINT. MODE
6817 035002  005037  047324                CLR EXDAT1          ;SPECIFY EXPECTED CACHE TAG/DATA PARITY STORE DATA
6818 035006  010537  047342                MOV R5,CMR119       ;SPECIFY CACHE TAG/DATA PARITY STORE DATA RECEIVED
6819                                                             ;THRU CMR<11:9>
6820 035012  012737  000011  002052        MOV #9.,LOOP        ;PREPARE CMR119 FOR TYPEOUT
6821 035020  006237  047342          11$:  ASR CMR119
6822 035024  042737  100000  047342        BIC #100000,CMR119
6823 035032  005337  002052                DEC LOOP
6824 035036  001370                        BNE 11$
6825
6826 035040  010037  047322                MOV R0,CA121        ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATI
6827 035044  006237  047322                ASR CA121
6828
     035050  104000                        ERROR                       ;ERROR
                                                                      ;-----
     035052  035050                        .-2
6829                                                             ;TAG/DATA PARITY STORE MARCH PATTERN TEST
6830                                                             ;READING CACHE TAG/DATA PARITY STORE DATA
6831                                                             ;THRU CMR<11:9> DID NOT READ ALL 0'S.
6832                                                             ;THIS SUGGESTS THAT A RAM LOCATION
6833                                                             ;SPECIFIED BY CA121 WAS OVERWRITTEN
6834                                                             ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
6835                                                             ;LOCATION.ANY BIT IN CMR119 DATA
6836                                                             ;THAT IS A 1 MAY POINT TO A BAD
6837                                                             ;CACHE TAG/DATA PARITY STORE RAM.
6838
6839 035054  047324                        EXDAT1              ;PRINT  EXPECTED CACHE TAG/DATA PARITY STORE DATA
```

```
6840 035056  047342                          CMR119                ;PRINT  CACHE TAG/DATA PARITY STORE RECEIVED
6841                                                                ;THRU CMR<11:9>
6842 035060  047322                          CA121                 ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATI
6843 035062  000000                          0
6844 035064  000452                          BR 3$                 ;END THE TEST
6845 035066  042703  170777            8$:   BIC #170777,R3        ;INTERESTED IN BITS 11:9 ONLY
6846 035072  022703  007000                  CMP #7000,R3          ;BITS 11:9 SHOULD BE ALL 1'S
6847 035076  001440                          BEQ 9$                ;PASS
6848
6849 035100  012737  001015  177746          MOV #OFF,CCR          ;DISABLE CACHE
6850 035106  105037  177750                  CLRB CMR              ;CLEAR MAINT. MODE
6851 035112  012737  000007  047324          MOV #7,EXDAT1         ;SPECIFY EXPECTED CACHE TAG/DATA PARITY STORE DATA
6852 035120  010337  047342                  MOV R3,CMR119         ;SPECIFY CACHE TAG/DATA PARITY STORE DATA READ
6853                                                                ;THRU CMR<11:9>
6854 035124  012737  000011  002052          MOV #9.,LOOP          ;PREPARE CMR119 FOR TYPEOUT
6855 035132  006237  047342            12$:  ASR CMR119
6856 035136  042737  100000  047342          BIC #100000,CMR119
6857 035144  005337  002052                  DEC LOOP
6858 035150  001370                          BNE 12$
6859 035152  010037  047322                  MOV R0,CA121          ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATI
6860 035156  006237  047322                  ASR CA121
6861
     035162  104000                          ERROR                         ;ERROR
                                                                           ;-----
     035164  035162                          .-2
6862                                                                ;TAG/DATA PARITY STORE MARCH PATTERN TEST
6863                                                                ;READING CACHE TAG/DATA PARITY STORE DATA
6864                                                                ;THRU CMR<11:9> DID NOT READ ALL 1'S.
6865                                                                ;ANY BIT IN CMR119 DATA
6866                                                                ;THAT IS A 0 MAY POINT TO A BAD
6867                                                                ;CACHE TAG/DATA PARITY STORE RAM.
6868
6869 035166  047324                          EXDAT1                ;PRINT  EXPECTED CACHE TAG/DATA PARITY STORE DATA
6870 035170  047342                          CMR119                ;PRINT CACHE TAG/DATA PARITY STORE DATA READ
6871                                                                ;THRU CMR<11:9>
6872 035172  047322                          CA121                 ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATI
6873 035174  000000                          0
6874 035176  000405                          BR 3$                 ;END TEST
6875 035200  062700  000002            9$:   ADD #2,R0             ;NEXT LOCATION
6876 035204  022700  070000                  CMP #70000,R0         ;HAS ALL LO CACHE BEEN DONE?
6877 035210  001244                          BNE 7$                ;NO,CONTINUE
6878 035212  012737  001015  177746    3$:   MOV #OFF,CCR          ;DISABLE CACHE
6879 035220  105037  177750                  CLRB CMR              ;DISABLE MAINT. MODE
6880 035224  000240                    10$:  NOP                   ;END OF TEST
6881
6882
6883
6884 035226  005237  001464          T177: INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 177
                                     .SBTTL
6885                                 .SBTTL
6886                                 .SBTTL  VERIFY CACHE TAG/DATA PARITY STORE RAM MEMORY IC'S BY PERFORMING A
6887                                 .SBTTL  MARCH PATTERN TEST TO HIGH CACHE AREA OF TAG/DATA PARITY STORE(LOC. 4000-7777)
6888                                 ;;;             PROCEDURE:  1. WRITE ALL 0'S TO ALL HI CACHE TAG/DATA PARITY STORE
6889                                 ;;;                            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.
                                        ;;;
                                        ;;;
                                        ;;;*************************************************************************
6900 035232  000004                                 SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                            ;ERROR/LOOP ON TEST
     035234  035244                                 40$                     ;TEST START LOCATION
     035236  060000                                 1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
     035240  000000                                 0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     035242  060126                                 25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
     035244  012737  001015  177746          40$:   MOV #OFF,CCR            ;DISABLE CACHE
     035252  004437  002324                         JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
     035256  035660                                 10$+2                   ;ADDRESS OF START OF NEXT TEST

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

6901 035260  012702  000401             1$:        MOV #401,R2             ;SETUP R2 WITH PATTERN 401
6902 035264  005037  177752                        CLR CHR                 ;LOAD AMR<8:0> WITH ALL 0'S
6903 035270  012700  070000                        MOV #70000,R0           ;ADDRESS 70000 TO R0
6904 035274  005020                     2$:        CLR (R0)+               ;CLEAR ALL HIGH CACHE MAIN MEMORY
6905 035276  020027  100000                        CMP R0,#100000
6906 035302  001374                                BNE 2$
6907 035304  012700  070000                        MOV #70000,R0           ;1ST ADDRESS LOCATION IN R0
6908 035310  012701  050000                        MOV #50000,R1           ;ADDRESS 50000 IN R1
6909 035314  112737  000003  177750               MOVB #HODO+TDAR,CMR     ;HODO ALLOWS CACHE UPDATES &  DATA /TAG PARITY
6910                                                                        ; STORE BITS TO BE WRITTEN TO
6911                                                                       ;CMR<11:9> ONLY DURING THE  DESTINATION
6912                                                                       ;ACCESS OF AN INSTRUCTION.
6913                                                                       ;TDAR ALLOWS TAG PARITY STORE GENERATOR
6914                                                                       ;INPUTS TO BE LOADED FROM AMR<8:0>
6915 035322  012737  000015  177746               MOV #15,CCR             ;NO UCB SO AS TO WRITE ENABLE PARITY
6916                                                                       ;STORE
6917 035330  005721                     6$:        TST (R1)+               ;
6918 035332  005720                                TST (R0)+               ;WRITE 0'S INTO ALL DATA/TAG PARITY STORE
6919                                                                       ;ADDRESS LOCATIONS SPECIFIED BY R0
6920 035334  022700  100000                        CMP #100000,R0          ;DONE?
6921 035340  001373                                BNE 6$                  ;NO
6922
6923 035342  012737  000001  177752               MOV #1,CHR              ;LOAD AMR<8:0> BY WRITING TO CHR<8:0>
6924 035350  012700  070000                        MOV #70000,R0           ;ADDR. 70000 TO R0
6925 035354  042737  000001  177750          7$:   BIC #TDAR,CMR           ;DISABLE TDAR TO  ALLOW  UPDATE
6926                                                                       ;OF CACHE TAG STORE THRU CA<21:13>
6927 035362  005710                                TST (R0)                ;READ MISS TO CACHE LOCATION SPECIFIED
6928                                                                       ;BY R0.  CLOCK TAG/DATA PARITY STORE
6929                                                                       ;BITS INTO CMR<11:9>.SHOULD BE ALL 0'S.
6930                                                                       ;ALSO CAUSES UPDATE TO CACHE.TAG/DATA
6931                                                                       ;PARITY STORE LOCATION SHOULD REMAIN
6932                                                                       ;WITH 0'S.
6933 035364  013705  177750                        MOV CMR,R5              ;SAVE CMR CONTENTS
6934 035370  052737  000001  177750               BIS #TDAR,CMR           ;ENABLE TDAR TO  ALLOW  TAG PARITY GENERATOR
```

```
6935
6936 035376  010210                          MOV R2,(R0)          ;INPUTS TO SEE ODD DATA FROM AMR<8:0>
6937                                                               ;WRITE HIT CAUSES UPDATE TO CACHE.
6938                                                               ;TAG/DATA PARITY STORES WILL BE WRITTEN
6939                                                               ;WITH 1'S DUE TO AMR<8:0> ODD DATA
6940                                                               ;AND PATTERN 401 FROM R2 BEING PUT
6941                                                               ;ONTO PAX DATA LINES RESULTING IN
6942                                                               ;ODD DATA FOR LO AND HI BYTE DATA PARITY
6943                                                               ;GENERATORS.
6944 035400  005710                          TST (R0)             ;READ MISS.CLOCK TAG/DATA PARITY STORE BITS TO
6945                                                               ;CMR<11:9>.SHOULD BE ALL 1'S.
6946 035402  013703  177750                   MOV CMR,R3           ;SAVE CMR CONTENTS
6947
     035406  000240                  25$:     NOP                  ;INSTRUCTION 'JMP 1$' PLACED HERE
     035410  000240                           NOP                  ;FOR  LOOP ON ERROR
6948
6949 035412  042705  170777                   BIC #170777,R5       ;INTERESTED IN BITS 11:9
6950 035416  005705                          TST R5               ;BITS 11:9 SHOULD BE ALL 0'S
6951 035420  001437                          BEQ 8$               ;PASS
6952
6953 035422  012737  001015  177746           MOV #OFF,CCR         ;DISABLE CACHE
6954 035430  105037  177750                   CLRB CMR             ;CLEAR MAINT. MODE
6955 035434  005037  047324                   CLR EXDAT1           ;SPECIFY EXPECTED CACHE TAG/DATA PARITY STORE DATA
6956 035440  010537  047342                   MOV R5,CMR119        ;SPECIFY CACHE TAG/DATA PARITY STORE DATA RECEIVED
6957                                                               ;THRU CMR<11:9>
6958 035444  012737  000011  002052           MOV #9.,LOOP         ;PREPARE CMR119 FOR TYPEOUT
6959 035452  006237  047342          11$:     ASR CMR119
6960 035456  042737  100000  047342           BIC #100000,CMR119
6961 035464  005337  002052                   DEC LOOP
6962 035470  001370                          BNE 11$
6963
6964 035472  010037  047322                   MOV R0,CA121         ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATI
6965 035476  006237  047322                   ASR CA121
6966
     035502  104000                           ERROR                        ;ERROR
                                                                           ;-----
     035504  035502                           .-2
6967                                                               ;TAG/DATA PARITY STORE MARCH PATTERN TEST
6968                                                               ;READING CACHE TAG/DATA PARITY STORE DATA
6969                                                               ;THRU CMR<11:9> DID NOT READ ALL 0'S.
6970                                                               ;THIS SUGGESTS THAT A RAM LOCATION
6971                                                               ;SPECIFIED BY CA121 WAS OVERWRITTEN
6972                                                               ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
6973                                                               ;LOCATION.ANY BIT IN CMR119 DATA
6974                                                               ;THAT IS A 1 MAY POINT TO A BAD
6975                                                               ;CACHE TAG/DATA PARITY STORE RAM.
6976
6977 035506  047324                          EXDAT1               ;PRINT  EXPECTED CACHE TAG/DATA PARITY STORE DATA
6978 035510  047342                          CMR119               ;PRINT  CACHE TAG/DATA PARITY STORE RECEIVED
6979                                                               ;THRU CMR<11:9>
6980 035512  047322                          CA121                ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATI
6981 035514  000000                          0
6982 035516  000452                          BR 3$                ;END THE TEST
6983 035520  042703  170777          8$:     BIC #170777,R3       ;INTERESTED IN BITS 11:9 ONLY
6984 035524  022703  007000                   CMP #7000,R3         ;BITS 11:9 SHOULD BE ALL 1'S
6985 035530  001440                          BEQ 9$               ;PASS
```

```
6986
6987 035532  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
6988 035540  105037  177750                  CLRB CMR                ;CLEAR MAINT. MODE
6989 035544  012737  000007  047324          MOV #7,EXDAT1           ;SPECIFY EXPECTED CACHE TAG/DATA PARITY STORE DATA
6990 035552  010337  047342                  MOV R3,CMR119           ;SPECIFY CACHE TAG/DATA PARITY STORE DATA READ
6991                                                                 ;THRU CMR<11:9>
6992 035556  012737  000011  002052          MOV #9.,LOOP            ;PREPARE CMR119 FOR TYPEOUT
6993 035564  006237  047342          12$:    ASR CMR119
6994 035570  042737  100000  047342          BIC #100000,CMR119
6995 035576  005337  002052                  DEC LOOP
6996 035602  001370                          BNE 12$
6997 035604  010037  047322                  MOV R0,CA121            ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATI
6998 035610  006237  047322                  ASR CA121
6999
     035614  104000                          ERROR                           ;ERROR
                                                                             ;-----
     035616  035614                          .-2
7000                                                                 ;TAG/DATA PARITY STORE MARCH PATTERN TEST
7001                                                                 ;READING CACHE TAG/DATA PARITY STORE DATA
7002                                                                 ;THRU CMR<11:9> DID NOT READ ALL 1'S.
7003                                                                 ;ANY BIT IN CMR119 DATA
7004                                                                 ;THAT IS A 0 MAY POINT TO A BAD
7005                                                                 ;CACHE TAG/DATA PARITY STORE RAM.
7006
7007 035620  047324                          EXDAT1                  ;PRINT  EXPECTED CACHE TAG/DATA PARITY STORE DATA
7008 035622  047342                          CMR119                  ;PRINT CACHE TAG/DATA PARITY STORE DATA READ
7009                                                                 ;THRU CMR<11:9>
7010 035624  047322                          CA121                   ;SPECIFY FAILED TAG/DATA PARITY STORE ADDRESS LOCATI
7011 035626  000000                          0
7012 035630  000405                          BR 3$                   ;END TEST
7013 035632  062700  000002          9$:     ADD #2,R0               ;NEXT LOCATION
7014 035636  022700  100000                  CMP #100000,R0          ;HAS ALL HI CACHE BEEN DONE?
7015 035642  001244                          BNE 7$                  ;NO,CONTINUE
7016 035644  012737  001015  177746  3$:     MOV #OFF,CCR            ;DISABLE CACHE
7017 035652  105037  177750                  CLRB CMR                ;DISABLE MAINT. MODE
7018 035656  000240                  10$:    NOP                     ;END OF TEST
7019
7020
7021
7022
7023
7024
7025                                 .SBTTL *
7026                                 .SBTTL
7027                                 .SBTTL *                CACHE VALID STORE RAM MEMORY MARCH PATTERN TEST -SET A
7028                                 .SBTTL
7029                                 .SBTTL *
7030
7031
7032
7033 035660  005237  001464          T200:           INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 200
                                     .SBTTL
7034                                 .SBTTL
7035                                 .SBTTL  VERIFY CACHE VALID STORE RAM MEMORY IC'S BY PERFORMING A
```

```
7036                    .SBTTL  MARCH PATTERN TEST TO LOW CACHE AREA OF VALID STORE(LOC. 0000-3777)
7037                    ;;;             PROCEDURE:  1. WRITE 0'S  TO LO CACHE VALID STORE
7038                    ;;;                            RAM CORRESPONDING TO LOCATIONS 0000-3777
7039                    ;;;                         2. READ 0 FROM  LO CACHE RAM CORRESPONDING
7040                    ;;;                            TO LOCATION 0000
7041                    ;;;                         3. WRITE  1 TO  RAM CORRESPONDING TO LOCATION
7042                    ;;;                            0000.
7043                    ;;;                         4. READ 1 FROM  RAM CORRESPONDING TO LOCATION
7044                    ;;;                            0000.
7045                    ;;;                         5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
7046                    ;;;                            AND UNTIL LOC. 3777 IS REACHED.
```

```
7048                                    ;;;
7049                                    ;;**************************************************************************
7050 035664  000004                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                           ;ERROR/LOOP ON TEST
     035666  035676                                40$                     ;TEST START LOCATION
     035670  070026                                1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     035672  000000                                0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     035674  070136                                25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     035676  012737  001015  177746          40$:  MOV #OFF,CCR            ;DISABLE CACHE
     035704  004437  002352                        JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     035710  036214                                10$+2                   ;ADDRESS OF START OF NEXT TEST

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

7051 035712  032737  020000  177746                BIT #VSIU,CCR           ;IS SET A USED
7052 035720  001407                                BEQ 1$                  ;YES
7053 035722  052737  000400  177746                BIS #FC,CCR             ;FLUSH
7054 035730  032737  010000  177746                BIT #VCIP,CCR
7055 035736  001374                                BNE .-6
7056
7057 035740                                     1$:
7058 035740  012700  060000                        MOV #60000,R0           ;1ST ADDRESS LOCATION IN R0
7059 035744  012701  040000                        MOV #40000,R1           ;ADDRESS 40000 IN R1
7060 035750  005002                                CLR R2
7061 035752  112737  000002  177750                MOVB #HODO,CMR          ;HODO ALLOWS CACHE UPDATES &  VALID
7062                                               ; STORE BITS TO BE WRITTEN TO
7063                                               ;CMR<12> ONLY DURING THE  DESTINATION
7064                                               ;ACCESS OF AN INSTRUCTION.
7065                                               ;STORE
7066 035760  012737  000015  177746                MOV #15,CCR             ;NO UCB SO AS TO UPDATE VALID STORE
7067 035766  005721                             6$:  TST (R1)+               ;
7068 035770  005720                                  TST (R0)+              ;UPDATE ALL LO CACHE VALID STORE
7069                                               ;ADDRESS LOCATIONS SPECIFIED BY R0
7070 035772  022700  070000                        CMP #70000,R0           ;DONE?
7071 035776  001373                                BNE 6$                  ;NO
7072
7073 036000  012700  060000                        MOV #60000,R0           ;ADDR. 60000 TO R0
7074 036004  052737  001000  177746                BIS #UCB,CCR            ;ENABLE UCB
7075 036012  010220                            13$:  MOV R2,(R0)+            ;WRITE HIT WITH UCB WILL INVALIDATE
7076                                               ;OR WRITE 0 TO ALL LO CACHE VALID STORE
7077 036014  022700  070000                        CMP #70000,R0           ;DONE?
7078 036020  001374                                BNE 13$                 ;NO
7079 036022  042737  001000  177746                BIC #UCB,CCR            ;DISABLE UCB SO AS TO ALLOW VALID STORE UPDATES
7080
7081 036030  012700  060000                        MOV #60000,R0           ;ADDRESS 60000 TO R0
7082 036034                                     7$:
7083 036034  005710                                TST (R0)                ;READ MISS TO CACHE LOCATION SPECIFIED
7084                                               ;BY R0.  CLOCK VALID STORE
7085                                               ;BIT INTO CMR<12>.SHOULD BE 0.
7086                                               ;ALSO CAUSES UPDATE TO CACHE.
7087                                               ;VALID STORE LOCATION WILL BE WRITTEN
7088                                               ;WITH A 1.
7089 036036  013705  177750                        MOV CMR,R5              ;SAVE CMR CONTENTS
7090 036042  005710                                TST (R0)                ;READ HIT.CLOCK VALID STORE BIT TO CMR<12>
7091                                               ;SHOULD BE 1.
7092 036044  013703  177750                        MOV CMR,R3              ;SAVE CMR CONTENTS
```

```
7093
     036050  000240                      25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     036052  000240                              NOP                     ;FOR  LOOP ON ERROR

7094
7095 036054  042705  167777                     BIC #167777,R5          ;INTERESTED IN BIT 12
7096 036060  005705                             TST R5                  ;BIT 12 SHOULD BE 0
7097 036062  001416                             BEQ 8$                  ;PASS
7098
7099 036064  012737  001015  177746             MOV #OFF,CCR            ;DISABLE CACHE
7100 036072  105037  177750                     CLRB CMR                ;CLEAR MAINT. MODE
7101 036076  010037  047322                     MOV R0,CA121            ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
7102 036102  006237  047322                     ASR CA121
7103
     036106  104000                             ERROR                           ;ERROR
                                                                                 ;-----
     036110  036106                             .-2
7104                                                                 ;VALID STORE MARCH PATTERN TEST- SET A
7105                                                                 ;READING CACHE VALID STORE DATA
7106                                                                 ;THRU CMR<12> DID NOT READ  0.
7107                                                                 ;THIS SUGGESTS THAT A RAM LOCATION
7108                                                                 ;SPECIFIED BY CA121 WAS OVERWRITTEN
7109                                                                 ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
7110                                                                 ;LOCATION.
7111                                                                 ;THIS INDICATES THAT VALID STORE RAM
7112                                                                 ;SET A IS BAD.
7113
7114 036112  047322                             CA121                   ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
7115 036114  000000                             0
7116 036116  000430                             BR 3$                   ;END THE TEST
7117 036120  042703  167777                8$:  BIC #167777,R3          ;INTERESTED IN BIT 12 ONLY
7118 036124  022703  010000                     CMP #10000,R3           ;BIT 12 SHOULD BE 1
7119 036130  001416                             BEQ 9$                  ;PASS
7120
7121 036132  012737  001015  177746             MOV #OFF,CCR            ;DISABLE CACHE
7122 036140  105037  177750                     CLRB CMR                ;CLEAR MAINT. MODE
7123 036144  010037  047322                     MOV R0,CA121            ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
7124 036150  006237  047322                     ASR CA121
7125
     036154  104000                             ERROR                           ;ERROR
                                                                                 ;-----
     036156  036154                             .-2
7126                                                                 ;VALID STORE MARCH PATTERN TEST- SET A
7127                                                                 ;READING CACHE VALID STORE DATA
7128                                                                 ;THRU CMR<12> DID NOT READ  1.
7129                                                                 ;THIS SUGGESTS THAT VALID STORE RAM
7130                                                                 ;IC SET A IS BAD.
7131
7132                                                                 ;THRU CMR<12>
7133 036160  047322                             CA121                   ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
7134 036162  000000                             0
7135 036164  000405                             BR 3$                   ;END TEST
7136 036166  062700  000002                9$:  ADD #2,R0               ;NEXT LOCATION
7137 036172  022700  070000                     CMP #70000,R0           ;HAS ALL LO CACHE BEEN DONE?
7138 036176  001316                             BNE 7$                  ;NO,CONTINUE
7139 036200  012737  001015  177746        3$:  MOV #OFF,CCR            ;DISABLE CACHE
7140 036206  105037  177750                     CLRB CMR                ;DISABLE MAINT. MODE
```

```
7141 036212  000240                        10$:    NOP                     ;END OF TEST
7142
7143
7144
7145
7146 036214  005237  001464          T201:         INC $TESTN              ;UPDATE TEST ID
                                      ;;*****************************************************************
                                      .SBTTL
                                      .SBTTL TEST 201
                                      .SBTTL
7147                                  .SBTTL
7148                                  .SBTTL  VERIFY CACHE VALID STORE RAM MEMORY IC'S BY PERFORMING A
7149                                  .SBTTL  MARCH PATTERN TEST TO HIGH CACHE AREA OF VALID STORE(LOC. 4000-7777)
7150                                  ;;;             PROCEDURE:  1. WRITE 0'S  TO HI CACHE VALID STORE
7151                                  ;;;                            RAM CORRESPONDING TO LOCATIONS 4000-7777
7152                                  ;;;                         2. READ 0 FROM  HI CACHE RAM CORRESPONDING
7153                                  ;;;                            TO LOCATION 4000
7154                                  ;;;                         3. WRITE  1 TO  RAM CORRESPONDING TO LOCATION
7155                                  ;;;                            4000
7156                                  ;;;                         4. READ 1 FROM  RAM CORRESPONDING TO LOCATION
7157                                  ;;;                            4000
7158                                  ;;;                         5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
7159                                  ;;;                            AND UNTIL LOC. 7777 IS REACHED.
7160                                  ;;;
7161                                  ;;*****************************************************************
7162 036220  000004                        SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                          ;ERROR/LOOP ON TEST
      036222  036232                        40$                             ;TEST START LOCATION
      036224  060026                        1$-40$+60000-14                 ;LOOP ON ERROR START LOCATION
      036226  000000                        0                               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      036230  060136                        25$-40$+60000-14                ;LOOP ON ERROR END LOCATION
      036232  012737  001015  177746  40$:   MOV #OFF,CCR                    ;DISABLE CACHE
      036240  004437  002324                JSR R4,RELCTL                   ;LOCATE TEST CODE TO LOW CACHE SPACE
      036244  036550                        10$+2                           ;ADDRESS OF START OF NEXT TEST

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

7163 036246  032737  020000  177746          BIT #VSIU,CCR                   ;IS SET A USED
7164 036254  001407                          BEQ 1$                          ;YES
7165 036256  052737  000400  177746          BIS #FC,CCR                     ;FLUSH
7166 036264  032737  010000  177746          BIT #VCIP,CCR
7167 036272  001374                          BNE .-6
7168
7169 036274                           1$:
7170 036274  012700  070000                  MOV #70000,R0                   ;1ST ADDRESS LOCATION IN R0
7171 036300  012701  050000                  MOV #50000,R1                   ;ADDRESS 50000 IN R1
7172 036304  005002                          CLR R2
7173 036306  112737  000002  177750          MOVB #HODO,CMR                  ;HODO ALLOWS CACHE UPDATES &  VALID
7174                                                                         ; STORE BITS TO BE WRITTEN TO
7175                                                                        ;CMR<12> ONLY DURING THE  DESTINATION
7176                                                                        ;ACCESS OF AN INSTRUCTION.
7177                                                                        ;STORE
7178 036314  012737  000015  177746          MOV #15,CCR                     ;NO UCB SO AS TO UPDATE VALID STORE
7179 036322  005721                   6$:    TST (R1)+                       ;
7180 036324  005720                          TST (R0)+                       ;UPDATE ALL HI CACHE VALID STORE
7181                                                                        ;ADDRESS LOCATIONS SPECIFIED BY R0
```

```
7182 036326  022700  100000                    CMP #100000,R0          ;DONE?
7183 036332  001373                            BNE 6$                  ;NO
7184
7185 036334  012700  070000                    MOV #70000,R0           ;ADDR. 70000 TO R0
7186 036340  052737  001000  177746            BIS #UCB,CCR            ;ENABLE UCB
7187 036346  010220                    13$:    MOV R2,(R0)+            ;WRITE HIT WITH UCB WILL INVALIDATE
7188                                            ;OR WRITE 0 TO ALL HI CACHE VALID STORE
7189 036350  022700  100000                    CMP #100000,R0          ;DONE?
7190 036354  001374                            BNE 13$                 ;NO
7191 036356  042737  001000  177746            BIC #UCB,CCR            ;DISABLE UCB SO AS TO ALLOW VALID STORE UPDATES
7192
7193 036364  012700  070000                    MOV #70000,R0           ;ADDRESS 70000 TO R0
7194 036370                            7$:
7195 036370  005710                            TST (R0)                ;READ MISS TO CACHE LOCATION SPECIFIED
7196                                            ;BY R0.  CLOCK VALID STORE
7197                                            ;BIT INTO CMR<12>.SHOULD BE 0.
7198                                            ;ALSO CAUSES UPDATE TO CACHE.
7199                                            ;VALID STORE LOCATION WILL BE WRITTEN
7200                                            ;WITH A 1.
7201 036372  013705  177750                    MOV CMR,R5              ;SAVE CMR CONTENTS
7202 036376  005710                            TST (R0)                ;READ HIT.CLOCK VALID STORE BIT TO CMR<12>
7203                                            ;SHOULD BE 1.
7204 036400  013703  177750                    MOV CMR,R3              ;SAVE CMR CONTENTS
7205
     036404  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     036406  000240                            NOP                     ;FOR  LOOP ON ERROR

7206
7207 036410  042705  167777                    BIC #167777,R5          ;INTERESTED IN BIT 12
7208 036414  005705                            TST R5                  ;BIT 12 SHOULD BE 0
7209 036416  001416                            BEQ 8$                  ;PASS
7210
7211 036420  012737  001015  177746            MOV #OFF,CCR            ;DISABLE CACHE
7212 036426  105037  177750                    CLRB CMR                ;CLEAR MAINT. MODE
7213 036432  010037  047322                    MOV R0,CA121            ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
7214 036436  006237  047322                    ASR CA121
7215
     036442  104000                            ERROR                           ;ERROR
                                                                            ;-----
     036444  036442                            .-2
7216                                            ;VALID STORE MARCH PATTERN TEST- SET A
7217                                            ;READING CACHE VALID STORE DATA
7218                                            ;THRU CMR<12> DID NOT READ  0.
7219                                            ;THIS SUGGESTS THAT A RAM LOCATION
7220                                            ;SPECIFIED BY CA121 WAS OVERWRITTEN
7221                                            ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
7222                                            ;LOCATION.
7223                                            ;THIS INDICATES THAT VALID STORE RAM
7224                                            ;SET A IS BAD.
7225
7226 036446  047322                            CA121                   ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
7227 036450  000000                            0
7228 036452  000430                            BR 3$                   ;END THE TEST
7229 036454  042703  167777            8$:     BIC #167777,R3          ;INTERESTED IN BIT 12 ONLY
7230 036460  022703  010000                    CMP #10000,R3           ;BIT 12 SHOULD BE 1
7231 036464  001416                            BEQ 9$                  ;PASS
7232
```

```
7233 036466  012737  001015  177746          MOV #OFF,CCR        ;DISABLE CACHE
7234 036474  105037  177750                  CLRB CMR            ;CLEAR MAINT. MODE
7235 036500  010037  047322                  MOV R0,CA121        ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
7236 036504  006237  047322                  ASR CA121
7237
     036510  104000                          ERROR                       ;ERROR
                                                                         ;-----
     036512  036510                          .-2
7238                                                             ;VALID STORE MARCH PATTERN TEST- SET A
7239                                                             ;READING CACHE VALID STORE DATA
7240                                                             ;THRU CMR<12> DID NOT READ  1.
7241                                                             ;THIS SUGGESTS THAT VALID STORE RAM
7242                                                             ;IC SET A IS BAD.
7243
7244                                                             ;THRU CMR<12>
7245 036514  047322                          CA121               ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
7246 036516  000000                          0
7247 036520  000405                          BR 3$               ;END TEST
7248 036522  062700  000002          9$:     ADD #2,R0           ;NEXT LOCATION
7249 036526  022700  100000                  CMP #100000,R0      ;HAS ALL HI CACHE BEEN DONE?
7250 036532  001316                          BNE 7$              ;NO,CONTINUE
7251 036534  012737  001015  177746  3$:     MOV #OFF,CCR        ;DISABLE CACHE
7252 036542  105037  177750                  CLRB CMR            ;DISABLE MAINT. MODE
7253 036546  000240                  10$:    NOP                 ;END OF TEST
7254
7255
7256
7257
7258
7259                                 .SBTTL *
7260                                 .SBTTL
7261                                 .SBTTL *                CACHE VALID STORE RAM MEMORY MARCH PATTERN TEST -SET B
7262                                 .SBTTL
7263                                 .SBTTL *
7264
7265
7266
7267 036550  005237  001464          T202:           INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 202
                                     .SBTTL
7268                                 .SBTTL
7269                                 .SBTTL   VERIFY CACHE VALID STORE RAM MEMORY IC'S BY PERFORMING A
7270                                 .SBTTL   MARCH PATTERN TEST TO LOW CACHE AREA OF VALID STORE(LOC. 0000-3777)
7271                                 ;;;              PROCEDURE:  1. WRITE 0'S  TO LO CACHE VALID STORE
7272                                 ;;;                             RAM CORRESPONDING TO LOCATIONS 0000-3777
7273                                 ;;;                         2.  READ 0 FROM  LO CACHE RAM CORRESPONDING
7274                                 ;;;                             TO LOCATION 0000
7275                                 ;;;                         3.  WRITE  1 TO  RAM CORRESPONDING TO LOCATION
7276                                 ;;;                             0000.
7277                                 ;;;                         4.  READ 1 FROM  RAM CORRESPONDING TO LOCATION
7278                                 ;;;                             0000.
7279                                 ;;;                         5.  REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
7280                                 ;;;                             AND UNTIL LOC. 3777 IS REACHED.
7281                                 ;;;
7282                                 ;;*****************************************************************
```

```
7283 036554  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
     036556  036566                          40$                     ;TEST START LOCATION
     036560  070026                          1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     036562  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     036564  070136                          25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     036566  012737  001015  177746  40$:    MOV #OFF,CCR            ;DISABLE CACHE
     036574  004437  002352                  JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     036600  037104                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

7284 036602  032737  020000  177746          BIT #VSIU,CCR           ;IS SET B USED
7285 036610  001007                          BNE 1$                  ;YES
7286 036612  052737  000400  177746          BIS #FC,CCR             ;FLUSH
7287 036620  032737  010000  177746          BIT #VCIP,CCR
7288 036626  001374                          BNE .-6
7289
7290 036630                                  1$:
7291 036630  012700  060000                  MOV #60000,R0           ;1ST ADDRESS LOCATION IN R0
7292 036634  012701  040000                  MOV #40000,R1           ;ADDRESS 40000 IN R1
7293 036640  005002                          CLR R2
7294 036642  112737  000002  177750          MOVB #HODO,CMR          ;HODO ALLOWS CACHE UPDATES &  VALID
7295                                                                 ; STORE BITS TO BE WRITTEN TO
7296                                                                 ;CMR<12> ONLY DURING THE  DESTINATION
7297                                                                 ;ACCESS OF AN INSTRUCTION.
7298                                                                 ;STORE
7299 036650  012737  000015  177746          MOV #15,CCR             ;NO UCB SO AS TO UPDATE VALID STORE
7300 036656  005721                  6$:     TST (R1)+               ;
7301 036660  005720                          TST (R0)+               ;UPDATE ALL LO CACHE VALID STORE
7302                                                                 ;ADDRESS LOCATIONS SPECIFIED BY R0
7303 036662  022700  070000                  CMP #70000,R0           ;DONE?
7304 036666  001373                          BNE 6$                  ;NO
7305
7306 036670  012700  060000                  MOV #60000,R0           ;ADDR. 60000 TO R0
7307 036674  052737  001000  177746          BIS #UCB,CCR            ;ENABLE UCB
7308 036702  010220                  13$:    MOV R2,(R0)+            ;WRITE HIT WITH UCB WILL INVALIDATE
7309                                                                 ;OR WRITE 0 TO ALL LO CACHE VALID STORE
7310 036704  022700  070000                  CMP #70000,R0           ;DONE?
7311 036710  001374                          BNE 13$                 ;NO
7312 036712  042737  001000  177746          BIC #UCB,CCR            ;DISABLE UCB SO AS TO ALLOW VALID STORE UPDATES
7313
7314 036720  012700  060000                  MOV #60000,R0           ;ADDRESS 60000 TO R0
7315 036724                                  7$:
7316 036724  005710                          TST (R0)                ;READ MISS TO CACHE LOCATION SPECIFIED
7317                                                                 ;BY R0.  CLOCK VALID STORE
7318                                                                 ;BIT INTO CMR<12>.SHOULD BE 0.
7319                                                                 ;ALSO CAUSES UPDATE TO CACHE.
7320                                                                 ;VALID STORE LOCATION WILL BE WRITTEN
7321                                                                 ;WITH A 1.
7322 036726  013705  177750                  MOV CMR,R5              ;SAVE CMR CONTENTS
7323 036732  005710                          TST (R0)                ;READ HIT.CLOCK VALID STORE BIT TO CMR<12>
7324                                                                 ;SHOULD BE 1.
7325 036734  013703  177750                  MOV CMR,R3              ;SAVE CMR CONTENTS
7326
     036740  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
```

```
        036742  000240                          NOP                     ;FOR  LOOP ON ERROR

 7327
 7328 036744  042705  167777                    BIC #167777,R5          ;INTERESTED IN BIT 12
 7329 036750  005705                            TST R5                  ;BIT 12 SHOULD BE 0
 7330 036752  001416                            BEQ 8$                  ;PASS
 7331
 7332 036754  012737  001015  177746            MOV #OFF,CCR            ;DISABLE CACHE
 7333 036762  105037  177750                    CLRB CMR                ;CLEAR MAINT. MODE
 7334 036766  010037  047322                    MOV R0,CA121            ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
 7335 036772  006237  047322                    ASR CA121
 7336
        036776  104000                          ERROR                           ;ERROR
                                                                                ;-----
        037000  036776                          .-2
 7337                                           ;VALID STORE MARCH PATTERN TEST- SET B
 7338                                           ;READING CACHE VALID STORE DATA
 7339                                           ;THRU CMR<12> DID NOT READ  0.
 7340                                           ;THIS SUGGESTS THAT A RAM LOCATION
 7341                                           ;SPECIFIED BY CA121 WAS OVERWRITTEN
 7342                                           ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
 7343                                           ;LOCATION.
 7344                                           ;THIS INDICATES THAT VALID STORE RAM
 7345                                           ;SET B IS BAD.
 7346
 7347 037002  047322                            CA121                   ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
 7348 037004  000000                            0
 7349 037006  000430                            BR 3$                   ;END THE TEST
 7350 037010  042703  167777            8$:     BIC #167777,R3          ;INTERESTED IN BIT 12 ONLY
 7351 037014  022703  010000                    CMP #10000,R3           ;BIT 12 SHOULD BE 1
 7352 037020  001416                            BEQ 9$                  ;PASS
 7353
 7354 037022  012737  001015  177746            MOV #OFF,CCR            ;DISABLE CACHE
 7355 037030  105037  177750                    CLRB CMR                ;CLEAR MAINT. MODE
 7356 037034  010037  047322                    MOV R0,CA121            ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
 7357 037040  006237  047322                    ASR CA121
 7358
        037044  104000                          ERROR                           ;ERROR
                                                                                ;-----
        037046  037044                          .-2
 7359                                           ;VALID STORE MARCH PATTERN TEST- SET B
 7360                                           ;READING CACHE VALID STORE DATA
 7361                                           ;THRU CMR<12> DID NOT READ  1.
 7362                                           ;THIS SUGGESTS THAT VALID STORE RAM
 7363                                           ;IC SET B IS BAD.
 7364
 7365                                           ;THRU CMR<12>
 7366 037050  047322                            CA121                   ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
 7367 037052  000000                            0
 7368 037054  000405                            BR 3$                   ;END TEST
 7369 037056  062700  000002            9$:     ADD #2,R0               ;NEXT LOCATION
 7370 037062  022700  070000                    CMP #70000,R0           ;HAS ALL LO CACHE BEEN DONE?
 7371 037066  001316                            BNE 7$                  ;NO,CONTINUE
 7372 037070  012737  001015  177746    3$:     MOV #OFF,CCR            ;DISABLE CACHE
 7373 037076  105037  177750                    CLRB CMR                ;DISABLE MAINT. MODE
 7374 037102  000240                    10$:    NOP                     ;END OF TEST
 7375
```

```
7376
7377
7378
7379 037104  005237  001464          T203:       INC $TESTN              ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 203
                                    .SBTTL
7380                                .SBTTL
7381                                .SBTTL  VERIFY CACHE VALID STORE RAM MEMORY IC'S BY PERFORMING A
7382                                .SBTTL  MARCH PATTERN TEST TO HIGH CACHE AREA OF VALID STORE(LOC. 4000-7777)
7383                                ;;;             PROCEDURE:  1. WRITE 0'S  TO HI CACHE VALID STORE
7384                                ;;;                            RAM CORRESPONDING TO LOCATIONS 4000-7777
7385                                ;;;                         2. READ 0 FROM  HI CACHE RAM CORRESPONDING
7386                                ;;;                            TO LOCATION 4000
7387                                ;;;                         3. WRITE  1 TO  RAM CORRESPONDING TO LOCATION
7388                                ;;;                            4000
7389                                ;;;                         4. READ 1 FROM  RAM CORRESPONDING TO LOCATION
7390                                ;;;                            4000
7391                                ;;;                         5. REPEAT SREPS 2 THRU 4 WITH NEXT LOCATION
7392                                ;;;                            AND UNTIL LOC. 7777 IS REACHED.
7393                                ;;;
7394                                ;;*****************************************************************
7395 037110  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                    ;ERROR/LOOP ON TEST
      037112  037122                          40$                     ;TEST START LOCATION
      037114  060026                          1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
      037116  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      037120  060136                          25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
      037122  012737  001015  177746  40$:    MOV #OFF,CCR            ;DISABLE CACHE
      037130  004437  002324                  JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
      037134  037440                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

7396 037136  032737  020000  177746          BIT #VSIU,CCR           ;IS SET B USED
7397 037144  001007                          BNE 1$                  ;YES
7398 037146  052737  000400  177746          BIS #FC,CCR             ;FLUSH
7399 037154  032737  010000  177746          BIT #VCIP,CCR
7400 037162  001374                          BNE .-6
7401
7402 037164                         1$:
7403 037164  012700  070000                  MOV #70000,R0           ;1ST ADDRESS LOCATION IN R0
7404 037170  012701  050000                  MOV #50000,R1           ;ADDRESS 50000 IN R1
7405 037174  005002                          CLR R2
7406 037176  112737  000002  177750          MOVB #HODO,CMR          ;HODO ALLOWS CACHE UPDATES &  VALID
7407                                                                ; STORE BITS TO BE WRITTEN TO
7408                                                                ;CMR<12> ONLY DURING THE  DESTINATION
7409                                                                ;ACCESS OF AN INSTRUCTION.
7410                                                                ;STORE
7411 037204  012737  000015  177746          MOV #15,CCR             ;NO UCB SO AS TO UPDATE VALID STORE
7412 037212  005721                  6$:     TST (R1)+               ;
7413 037214  005720                          TST (R0)+               ;UPDATE ALL HI CACHE VALID STORE
7414                                                                ;ADDRESS LOCATIONS SPECIFIED BY R0
7415 037216  022700  100000                  CMP #100000,R0          ;DONE?
7416 037222  001373                          BNE 6$                  ;NO
```

```
7417
7418 037224  012700  070000                    MOV #70000,R0          ;ADDR. 70000 TO R0
7419 037230  052737  001000  177746            BIS #UCB,CCR           ;ENABLE UCB
7420 037236  010220                    13$:    MOV R2,(R0)+           ;WRITE HIT WITH UCB WILL INVALIDATE
7421                                            ;OR WRITE 0 TO ALL HI CACHE VALID STORE
7422 037240  022700  100000                    CMP #100000,R0         ;DONE?
7423 037244  001374                            BNE 13$                ;NO
7424 037246  042737  001000  177746            BIC #UCB,CCR           ;DISABLE UCB SO AS TO ALLOW VALID STORE UPDATES
7425
7426 037254  012700  070000                    MOV #70000,R0          ;ADDRESS 70000 TO R0
7427 037260                            7$:
7428 037260  005710                            TST (R0)               ;READ MISS TO CACHE LOCATION SPECIFIED
7429                                            ;BY R0.  CLOCK VALID STORE
7430                                            ;BIT INTO CMR<12>.SHOULD BE 0.
7431                                            ;ALSO CAUSES UPDATE TO CACHE.
7432                                            ;VALID STORE LOCATION WILL BE WRITTEN
7433                                            ;WITH A 1.
7434 037262  013705  177750                    MOV CMR,R5             ;SAVE CMR CONTENTS
7435 037266  005710                            TST (R0)               ;READ HIT.CLOCK VALID STORE BIT TO CMR<12>
7436                                            ;SHOULD BE 1.
7437 037270  013703  177750                    MOV CMR,R3             ;SAVE CMR CONTENTS
7438
     037274  000240                    25$:    NOP                    ;INSTRUCTION 'JMP 1$' PLACED HERE
     037276  000240                            NOP                    ;FOR  LOOP ON ERROR

7439
7440 037300  042705  167777                    BIC #167777,R5         ;INTERESTED IN BIT 12
7441 037304  005705                            TST R5                 ;BIT 12 SHOULD BE 0
7442 037306  001416                            BEQ 8$                 ;PASS
7443
7444 037310  012737  001015  177746            MOV #OFF,CCR           ;DISABLE CACHE
7445 037316  105037  177750                    CLRB CMR               ;CLEAR MAINT. MODE
7446 037322  010037  047322                    MOV R0,CA121           ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
7447 037326  006237  047322                    ASR CA121
7448
     037332  104000                            ERROR                          ;ERROR
                                                                               ;-----
     037334  037332                            .-2
7449                                           ;VALID STORE MARCH PATTERN TEST- SET B
7450                                           ;READING CACHE VALID STORE DATA
7451                                           ;THRU CMR<12> DID NOT READ  0.
7452                                           ;THIS SUGGESTS THAT A RAM LOCATION
7453                                           ;SPECIFIED BY CA121 WAS OVERWRITTEN
7454                                           ;WITH A 1 WHEN WRITING A 1 TO ANOTHER
7455                                           ;LOCATION.
7456                                           ;THIS INDICATES THAT VALID STORE RAM
7457                                           ;SET B IS BAD.
7458
7459 037336  047322                            CA121                  ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
7460 037340  000000                            0
7461 037342  000430                            BR 3$                  ;END THE TEST
7462 037344  042703  167777            8$:     BIC #167777,R3         ;INTERESTED IN BIT 12 ONLY
7463 037350  022703  010000                    CMP #10000,R3          ;BIT 12 SHOULD BE 1
7464 037354  001416                            BEQ 9$                 ;PASS
7465
7466 037356  012737  001015  177746            MOV #OFF,CCR           ;DISABLE CACHE
7467 037364  105037  177750                    CLRB CMR               ;CLEAR MAINT. MODE
```

```
7468 037370  010037  047322                    MOV R0,CA121          ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
7469 037374  006237  047322                    ASR CA121
7470
     037400  104000                            ERROR                         ;ERROR
                                                                              ;-----
     037402  037400                            .-2
7471                                                                 ;VALID STORE MARCH PATTERN TEST- SET B
7472                                                                 ;READING CACHE VALID STORE DATA
7473                                                                 ;THRU CMR<12> DID NOT READ  1.
7474                                                                 ;THIS SUGGESTS THAT VALID STORE RAM
7475                                                                 ;IC SET B IS BAD.
7476
7477                                                                 ;THRU CMR<12>
7478 037404  047322                            CA121                 ;SPECIFY FAILED VALID STORE ADDRESS LOCATION
7479 037406  000000                            0
7480 037410  000405                            BR 3$                 ;END TEST
7481 037412  062700  000002              9$:   ADD #2,R0             ;NEXT LOCATION
7482 037416  022700  100000                    CMP #100000,R0        ;HAS ALL HI CACHE BEEN DONE?
7483 037422  001316                            BNE 7$                ;NO,CONTINUE
7484 037424  012737  001015  177746       3$:   MOV #OFF,CCR          ;DISABLE CACHE
7485 037432  105037  177750                    CLRB CMR              ;DISABLE MAINT. MODE
7486 037436  000240                      10$:  NOP                   ;END OF TEST
7487
7488
7489
7490
7491
7492
7493
7494
7495
7496
7497                                     .SBTTL *
7498                                     .SBTTL
7499                                     .SBTTL *        CACHE HIT TESTS
7500                                     .SBTTL          ;--------------
7501                                     .SBTTL
7502                                     .SBTTL *
7503
7504
7505
7506
7507
7508 037440  005237  001464              T204:          INC $TESTN              ;UPDATE TEST ID
                                         ;;*****************************************************************
                                         .SBTTL
                                         .SBTTL TEST 204
                                         .SBTTL
7509                                     .SBTTL
7510                                     .SBTTL  VERIFY THAT THE CACHE HIT NAND GATE CAN INDICATE A READ
7511                                     .SBTTL          HIT CONDITION.
7512                                     .SBTTL
7513                                     ;;;             PROCEDURE:      CREATE A READ HIT CONDITION TO LO CACHE
7514                                     ;;;                             WITH LO CACHE ENABLED,AND VERIFY THAT
7515                                     ;;;                             OUTPUT OF THE CACHE HIT NAND GATE  READS 0
7516                                     ;;;                             THRU CMR<8>.
7517                                     ;;;
```

```
                                ;;;             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
                                ;;;
                                ;;;*************************************************************************
037444  000004                                  SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
037446  037456                                  40$                     ;TEST START LOCATION
037450  070004                                  1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
037452  070030                                  20$-40$+70000-14        ;SCOPE SYNC. LOCATION
037454  070040                                  25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
037456  012737  001015  177746          40$:    MOV #OFF,CCR            ;DISABLE CACHE
037464  004437  002352                          JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
037470  037562                                  10$+2                   ;ADDRESS OF START OF NEXT TEST

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

037472  005037  060000                          CLR 60000               ;ALL 0'S TO MAIN MEMORY LOC. 60000
037476  112737  000002  177750          1$:     MOVB #HODO,CMR          ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AN
                                                                        ;CLOCKING OF OUTPUT OF CACHE HIT NAND
                                                                        ;GATE INTO CMR ONLY DURING THE DESTINATION
                                                                        ;ACCESS OF AN INSTRUCTION.
037504  012737  000011  177746                  MOV #11,CCR             ;NO UCB SO AS TO WRITE CACHE STORES
                                                                        ;ENABLE LOW CACHE FOR A READ HIT
037512  005737  040000                          TST 40000               ;
037516  005737  060000                          TST 60000               ;READ UPDATE TO LOW CACHE LOACATION 0000
037522  005737  060000          20$:    TST 60000                       ;READ HIT; ALL INPUTS OF CACHE HIT NAND
                                                                        ;GATE ARE 1; CLOCK STATUS OF NAND GATE
                                                                        ;OUTPUT TO CMR<8>
037526  013701  177750                          MOV CMR,R1              ;SAVE CMR CONTENTS

037532  000240                  25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
037534  000240                          NOP                             ;FOR  LOOP ON ERROR

037536  012737  001015  177746                  MOV #OFF,CCR            ;DISABLE CACHE
037544  032701  000400                          BIT #HIT,R1             ;WAS CACHE HIT SIGNAL A 0
037550  001403                                  BEQ 10$                 ;PASS


037552  104000                                  ERROR                           ;ERROR
                                                                                ;-----
037554  037552                                  .-2

                                ;CACHE HIT TESTS
                                ;READING OUTPUT OF CACHE HIT NAND GATE
                                ;THRU CMR<8> DID NOT RESULT IN A 0

037556  000000                                  0

                                                        ;;;
```

```
7557 037560  000240                        10$:    NOP             ;END OF TEST
7558
7559
7560
7561
7562 037562  005237  001464          T205:         INC $TESTN              ;UPDATE TEST ID
                                      ;;*************************************************************************
                                      .SBTTL
                                      .SBTTL TEST 205
                                      .SBTTL
7563                                  .SBTTL
7564                                  .SBTTL  CHECK FORCE MISS LOGIC.
7565                                  .SBTTL
7566                                  ;;;             PROCEDURE:      CREATE A READ HIT CONDITION TO HIGH CACHE
7567                                  ;;;                             WITH 'FORCE MISS HI' DISABLED AND 'FORCE MISS
7568                                  ;;;                             LO' ENABLED. VERIFY OUTPUT OF CACHE HIT NAND
7569                                  ;;;                             GATE READS A 0 THRU CMR<8>.
7570                                  ;;;
7571                                  ;;;             CONDITIONS:     INPUTS CACHE HIT NAND GATE:
7572                                  ;;;                               COMPARE 1     =1
7573                                  ;;;                               COMPARE 2     =1
7574                                  ;;;                               COMPARE 3     =1
7575                                  ;;;                               VALID         =1
7576                                  ;;;                               TAG PAR. ERR  =1
7577                                  ;;;                               HI BYTE PE    =1
7578                                  ;;;                               LO BYTE PE    =1
7579                                  ;;;                               MISS HI       =1
7580                                  ;;;                               MISS LO       =1
7581                                  ;;;                               BYPASS/WRITE  =1
7582                                  ;;;                               FAULT         =1
7583                                  ;;;
7584                                  ;;*************************************************************************
7585 037566  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      037570  037600                            40$                     ;TEST START LOCATION
      037572  060004                            1$-40$+60000-14         ;LOOP ON ERROR START LOCATION
      037574  060030                            20$-40$+60000-14        ;SCOPE SYNC LOCATION
      037576  060040                            25$-40$+60000-14        ;LOOP ON ERROR END LOCATION
      037600  012737  001015  177746    40$:    MOV #OFF,CCR            ;DISABLE CACHE
      037606  004437  002324                    JSR R4,RELCTL           ;LOCATE TEST CODE TO LOW CACHE SPACE
      037612  037704                            10$+2                   ;ADDRESS OF START OF NEXT TEST

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

7586 037614  005037  070000                    CLR 70000               ;ALL 0'S TO MAIN MEMORY LOC. 70000
7587 037620  112737  000002  177750    1$:     MOVB #HODO,CMR          ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AN
7588                                                                    ;CLOCKING OF OUTPUT OF CACHE HIT NAND
7589                                                                    ;GATE INTO CMR ONLY DURING THE DESTINATION
7590                                                                    ;ACCESS OF AN INSTRUCTION.
7591 037626  012737  000005  177746            MOV #5,CCR              ;NO UCB SO AS TO WRITE CACHE STORES
7592                                                                    ;ENABLE HI CACHE FOR A READ HIT
7593                                                                    ;DISABLE LO CACHE
7594 037634  005737  050000                    TST 50000               ;
7595 037640  005737  070000                    TST 70000               ;READ UPDATE TO HI CACHE LOACATION 4000
7596 037644  005737  070000            20$:    TST 70000               ;READ HIT; ALL INPUTS OF CACHE HIT NAND
7597                                                                    ;GATE ARE 1; CLOCK STATUS OF NAND GATE
```

```
7598
7599 037650  013701  177750                    MOV CMR,R1              ;OUTPUT TO CMR<8>
7600                                           ;SAVE CMR CONTENTS
     037654  000240                  25$:      NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     037656  000240                            NOP                     ;FOR  LOOP ON ERROR
7601 037660  012737  001015  177746            MOV #OFF,CCR            ;DISABLE CACHE
7602 037666  032701  000400                    BIT #HIT,R1             ;WAS CACHE HIT SIGNAL A 0
7603 037672  001403                            BEQ 10$                 ;PASS
7604
7605
     037674  104000                            ERROR                           ;ERROR
                                                                            ;-----
     037676  037674                            .-2
7606                                           ;CACHE HIT TESTS
7607                                           ;READING OUTPUT OF CACHE HIT NAND GATE
7608                                           ;THRU CMR<8> DID NOT RESULT IN A 0
7609 037700  000000                            0
7610                                                                    ;;;
7611 037702  000240                  10$:      NOP             ;END OF TEST
7612
7613
7614
7615
7616 037704  005237  001464          T206:     INC $TESTN              ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 206
                                    .SBTTL
7617                                .SBTTL
7618                                .SBTTL  VERIFY THAT 'FORCE MISS LO' WILL INHIBIT CACHE HIT NAND GATE
7619                                .SBTTL  FROM INDICATING A CACHE HIT.
7620                                .SBTTL
7621                                ;;;             PROCEDURE:      WITH 'FORCE MISS LO' ENABLED ATTEMPT A READ HIT TO LOW CACHE
7622                                ;;;                             VERIFY THAT THE OUTPUT OF CACHE HIT NAND GATE
7623                                ;;;                             WILL READ AS A 1 THRU CMR<8>.
7624                                ;;;
7625                                ;;;             CONDITIONS:     INPUTS CACHE HIT NAND GATE:
7626                                ;;;                               COMPARE 1     =1
7627                                ;;;                               COMPARE 2     =1
7628                                ;;;                               COMPARE 3     =1
7629                                ;;;                               VALID         =1
7630                                ;;;                               TAG PAR. ERR  =1
7631                                ;;;                               HI BYTE PE    =1
7632                                ;;;                               LO BYTE PE    =1
7633                                ;;;                               MISS HI       =1
7634                                ;;;                               MISS LO       =0
7635                                ;;;                               BYPASS/WRITE  =1
7636                                ;;;                               FAULT         =1
7637                                ;;;
7638                                ;;*****************************************************************
7639 037710  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     037712  037722                            40$                     ;TEST START LOCATION
     037714  070004                            1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     037716  070030                            20$-40$+70000-14        ;SCOPE SYNC. LOCATION
     037720  070040                            25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
```

```
037722  012737  001015  177746          40$:    MOV #OFF,CCR            ;DISABLE CACHE
037730  004437  002352                          JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
037734  040026                                  10$+2                   ;ADDRESS OF START OF NEXT TEST

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

7640 037736  005037  060000                    CLR 60000               ;ALL 0'S TO MAIN MEMORY LOC. 60000
7641 037742  112737  000002  177750     1$:    MOVB #HODO,CMR          ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AN
7642                                                                    ;CLOCKING OF OUTPUT OF CACHE HIT NAND
7643                                                                    ;GATE INTO CMR ONLY DURING THE DESTINATION
7644                                                                    ;ACCESS OF AN INSTRUCTION.
7645 037750  012737  000015  177746          MOV #15,CCR             ;NO UCB SO AS TO WRITE CACHE STORES
7646                                                                    ;DISABLE LOW CACHE
7647 037756  005737  040000                    TST 40000               ;
7648 037762  005737  060000                    TST 60000               ;READ UPDATE TO LOW CACHE LOACATION 0000
7649 037766  005737  060000          20$:      TST 60000               ;READ HIT;
7650                                                                    ; CLOCK STATUS OF NAND GATE
7651                                                                    ;OUTPUT TO CMR<8>
7652 037772  013701  177750                    MOV CMR,R1              ;SAVE CMR CONTENTS
7653
     037776  000240                  25$:      NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     040000  000240                            NOP                     ;FOR  LOOP ON ERROR

7654 040002  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
7655 040010  032701  000400                    BIT #HIT,R1             ;WAS CACHE HIT SIGNAL A 1
7656 040014  001003                            BNE 10$                 ;PASS
7657
7658
     040016  104000                            ERROR                           ;ERROR
                                                                               ;-----
     040020  040016                            .-2
7659                                                            ;CACHE HIT TESTS
7660                                                            ;READING OUTPUT OF CACHE HIT NAND GATE
7661                                                            ;THRU CMR<8> DID NOT RESULT IN A 1
7662 040022  000000                            0
7663                                                                    ;;;
7664 040024  000240                  10$:      NOP             ;END OF TEST
7665
7666
7667
7668
7669
7670
7671
7672 040026  005237  001464          T207:     INC $TESTN              ;UPDATE TEST ID
                                        ;;**************************************************************************
                                        .SBTTL
                                        .SBTTL  TEST 207
                                        .SBTTL
7673                                    .SBTTL
7674                                    .SBTTL   VERIFY THAT 'TAG PARITY ERROR' WILL INHIBIT CACHE HIT NAND GATE
7675                                    .SBTTL   FROM INDICATING A CACHE HIT.
7676                                    .SBTTL
7677                                    ;;;             CONDITIONS:     INPUTS CACHE HIT NAND GATE:
7678                                    ;;;                               COMPARE 1     =1
7679                                    ;;;                               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
                                        ;;;
                                        ;;;*****************************************************************
040032  000004                                      SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                            ;ERROR/LOOP ON TEST
040034  040044                                      40$                     ;TEST START LOCATION
040036  070000                                      1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
040040  070054                                      20$-40$+70000-14        ;SCOPE SYNC. LOCATION
040042  070072                                      25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
040044  012737  001015  177746          40$:       MOV #OFF,CCR            ;DISABLE CACHE
040052  004437  002352                              JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
040056  040212                                      10$+2                   ;ADDRESS OF START OF NEXT TEST

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

040060  005037  000000                  1$:        CLR 0                   ;0'S TO MAIN MEMORY LOCATION 0.
040064  112737  000002  177750                     MOVB #HODO,CMR          ;HODO ALLOWS UPDATES AND CACHE HITS
                                                                            ; ONLY DURING THE DESTINATION ACCESS OF
                                                                            ;AN INSTRUCTION.
040072  012737  000015  177746                     MOV #15,CCR             ;NO UCB SO AS TO WRITE CACHE STORES
040100  005737  000000                             TST 0                   ;
040104  005737  040000                             TST 40000               ;UPDATE CACHE LOCATION 0000 WITH CORRECT PARITY STOR
040110  052737  002000  177746                     BIS #WWPT,CCR           ;ALLOW WRITE WRONG PARITY TO TAGG PARITY STORE
040116  005737  000000                             TST 0                   ;READ UPDATE TO CACHE LOCATION 0000;
                                                                            ;ALL 0'S(EVEN DATA) WILL BE WRITTEN TO DATA/TAG STOR
                                                                            ;0'S INTO DATA PARITY STORES,AND A 1
```

```
7704
7705 040122  042737  002004  177746          BIC #WWPT+FMLO,CCR      ;INTO TAG PARITY STORE.
7706 040130  005037  177744                  CLR CME                 ;DISABLE WWPT;ENABLE LOW CACHE
7707 040134  005737  000000          20$:    TST 0                   ;CLEAR CME
7708                                                                 ;READ HIT; ALL 0'S WILL BE PLACED ON INPUTS
7709                                                                 ;OF DATA PARITY ERROR CHECK PARITY GEN'S, BUT
7710                                                                 ;TAG PARITY CHECK GENERATOR WILL
7711                                                                 ;SEE ODD DATA DUE TO WRONG PARITY
7712                                                                 ;FROM PREVIOUS READ UPDATE.
7713 040140  013701  177750                  MOV CMR,R1              ;OUTPUT TO CMR<8>
7714 040144  012737  001015  177746          MOV #OFF,CCR            ;SAVE CMR CONTENTS
7715                                                                 ;DISABLE CACHE
     040152  000240          25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
     040154  000240                  NOP                             ;FOR  LOOP ON ERROR

7716 040156  052737  000400  177746          BIS #FC,CCR             ;BEFORE LEAVING TEST ELIMINATE EFFECTS
7717                                                                 ;OF WWPT
7718 040164  032737  010000  177746          BIT #VCIP,CCR           ;WAIT TILL DONE
7719 040172  001374                          BNE .-6
7720 040174  032701  000400                  BIT #HIT,R1             ;WAS CACHE HIT SIGNAL A 1
7721 040200  001003                          BNE 10$                 ;PASS
7722
7723
     040202  104000                          ERROR                           ;ERROR
                                                                             ;-----
     040204  040202                          .-2
7724                                                                 ;CACHE HIT TESTS
7725                                                                 ;READING OUTPUT OF CACHE HIT NAND GATE
7726                                                                 ;THRU CMR<8> DID NOT RESULT IN A 1
7727 040206  000000                          0
7728                                                                         ;;;
7729 040210  000240          10$:    NOP             ;END OF TEST
7730
7731
7732
7733
7734
7735
7736 040212  005237  001464  T210:           INC $TESTN              ;UPDATE TEST ID
                             ;;*****************************************************************
                             .SBTTL
                             .SBTTL TEST 210
                             .SBTTL
7737                         .SBTTL
7738                         .SBTTL  VERIFY THAT 'LO & HI BYTE PARITY ERROR' WILL INHIBIT CACHE HIT NAND GATE
7739                         .SBTTL  FROM INDICATING A CACHE HIT.
7740                         .SBTTL
7741                         ;;;
7742                         ;;;             CONDITIONS:     INPUTS CACHE HIT NAND GATE:
7743                         ;;;                               COMPARE 1     =1
7744                         ;;;                               COMPARE 2     =1
7745                         ;;;                               COMPARE 3     =1
7746                         ;;;                               VALID         =1
7747                         ;;;                               TAG PAR. ERR  =1
7748                         ;;;                               HI BYTE PE    =0
7749                         ;;;                               LO BYTE PE    =0
7750                         ;;;                               MISS HI       =1
```

```
                                ;;;                             MISS LO         =1
                                ;;;                             BYPASS/WRITE    =1
                                ;;;                             FAULT           =1
                                ;;;
                                ;;;
                                ;;*****************************************************************
040216  000004                                SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
040220  040230                                40$                     ;TEST START LOCATION
040222  070000                                1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
040224  070054                                20$-40$+70000-14        ;SCOPE SYNC. LOCATION
040226  070072                                25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
040230  012737  001015  177746        40$:    MOV #OFF,CCR            ;DISABLE CACHE
040236  004437  002352                        JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
040242  040376                                10$+2                   ;ADDRESS OF START OF NEXT TEST

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

040244  005037  000000            1$:         CLR 0                   ;0'S TO MAIN MEMORY LOCATION 0.

040250  112737  000002  177750                MOVB #HODO,CMR          ;HODO ALLOWS UPDATES AND CACHE HITS
                                                                        ; ONLY DURING THE DESTINATION ACCESS OF
                                                                        ;AN INSTRUCTION.
040256  012737  000015  177746                MOV #15,CCR             ;NO UCB SO AS TO WRITE CACHE STORES
040264  005737  000000                        TST 0                   ;
040270  005737  040000                        TST 40000               ;UPDATE CACHE LOCATION 0000 WITH CORRECT PARITY STOR
040274  052737  000100  177746                BIS #WWPD,CCR           ;ALLOW WRITE WRONG PARITY DATA TO LO
                                                                        ;& HI BYTE PARITY STORE.
040302  005737  000000                        TST 0                   ;READ UPDATE TO CACHE LOCATION 0000;
                                                                        ;ALL 0'S WILL BE WRITTEN TO DATA/TAG STORES,
                                                                        ;1'S INTO LO & HI BYTE DATA PARITY STORES,AND A 0
                                                                        ;INTO TAG PARITY STORE.
040306  042737  000104  177746                BIC #WWPD+FMLO,CCR      ;DISABLE WWPD;ENABLE LO CACHE
040314  005037  177744                        CLR CME                 ;CLEAR CME
040320  005737  000000            20$:        TST 0                   ;READ HIT; ALL 0'S(EVEN DATA) WILL BE
                                                                        ;PLACED ON INPUTS
                                                                        ;OF TAG PARITY ERROR CHECK PARITY GEN'S, BUT
                                                                        ;LO & HI BYTE PARITY CHECK GENERATORS WILL
                                                                        ;SEE ODD DATA DUE TO WRONG PARITY
                                                                        ;FROM PREVIOUS READ UPDATE.
                                                                        ; CLOCK STATUS OF NAND GATE TO
                                                                        ;OUTPUT TO CMR<8>
040324  013701  177750                        MOV CMR,R1              ;SAVE CMR CONTENTS
040330  012737  001015  177746                MOV #OFF,CCR            ;DISABLE CACHE

040336  000240            25$:                NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
040340  000240                                NOP                     ;FOR  LOOP ON ERROR

040342  052737  000400  177746                BIS #FC,CCR             ;BEFORE LEAVING TEST ELIMINATE EFFECTS
                                                                        ;OF WWPD
040350  032737  010000  177746                BIT #VCIP,CCR           ;WAIT TILL DONE
040356  001374                                BNE .-6
040360  032701  000400                        BIT #HIT,R1             ;WAS CACHE HIT SIGNAL A 1
040364  001003                                BNE 10$                 ;PASS

040366  104000                                ERROR                           ;ERROR
```

```
                                                                    ;-----
      040370  040366                          .-2
 7792                                                               ;CACHE HIT TESTS
 7793                                                               ;READING OUTPUT OF CACHE HIT NAND GATE
 7794                                                               ;THRU CMR<8> DID NOT RESULT IN A 1
 7795 040372  000000                          0
 7796                                                               ;;;
 7797 040374  000240                    10$:  NOP                   ;END OF TEST
 7798
 7799
 7800
 7801
 7802
 7803
 7804 040376  005237  001464          T211:  INC $TESTN            ;UPDATE TEST ID
                                      ;;*****************************************************************
                                      .SBTTL
                                      .SBTTL TEST 211
                                      .SBTTL
 7805                                 .SBTTL
 7806                                 .SBTTL  VERIFY THAT 'FORCE MISS HI' WILL INHIBIT CACHE HIT NAND GATE
 7807                                 .SBTTL  FROM INDICATING A CACHE HIT.
 7808                                 .SBTTL
 7809                                 ;;;          PROCEDURE:     WITH 'FORCE MISS HI' ENABLED ATTEMPT A READ HIT TO HI CACHE.
 7810                                 ;;;                         VERIFY THAT THE OUTPUT OF CACHE HIT NAND GATE
 7811                                 ;;;                         WILL READ AS A 1 THRU CMR<8>.
 7812                                 ;;;
 7813                                 ;;;          CONDITIONS:    INPUTS CACHE HIT NAND GATE:
 7814                                 ;;;                           COMPARE 1     =1
 7815                                 ;;;                           COMPARE 2     =1
 7816                                 ;;;                           COMPARE 3     =1
 7817                                 ;;;                           VALID         =1
 7818                                 ;;;                           TAG PAR. ERR  =1
 7819                                 ;;;                           HI BYTE PE    =1
 7820                                 ;;;                           LO BYTE PE    =1
 7821                                 ;;;                           MISS HI       =0
 7822                                 ;;;                           MISS LO       =1
 7823                                 ;;;                           BYPASS/WRITE  =1
 7824                                 ;;;                           FAULT         =1
 7825                                 ;;;
 7826                                 ;;*****************************************************************
 7827 040402  000004                          SCPCND                 ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                     ;ERROR/LOOP ON TEST
      040404  040414                          40$                    ;TEST START LOCATION
      040406  060004                          1$-40$+60000-14        ;LOOP ON ERROR START LOCATION
      040410  060030                          20$-40$+60000-14       ;SCOPE SYNC LOCATION
      040412  060040                          25$-40$+60000-14       ;LOOP ON ERROR END LOCATION
      040414  012737  001015  177746    40$:  MOV #OFF,CCR           ;DISABLE CACHE
      040422  004437  002324                  JSR R4,RELCTL          ;LOCATE TEST CODE TO LOW CACHE SPACE
      040426  040520                          10$+2                  ;ADDRESS OF START OF NEXT TEST

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

 7828 040430  005037  070000                  CLR 70000              ;ALL 0'S TO MAIN MEMORY LOC. 70000
 7829 040434  112737  000002  177750    1$:   MOVB #HODO,CMR         ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AN
 7830                                                                ;CLOCKING OF OUTPUT OF CACHE HIT NAND
```

```
7831                                                    ;GATE INTO CMR ONLY DURING THE DESTINATION
7832                                                    ,ACCESS OF AN INSTRUCTION.
7833 040442  012737  000015  177746          MOV #15,CCR       ;NO UCB SO AS TO WRITE CACHE STORES
7834                                                    ;DISABLE HI CACHE
7835 040450  005737  050000                  TST 50000         ;
7836 040454  005737  070000                  TST 70000         ;READ UPDATE HI CACHE LOCATION 4000
7837 040460  005737  070000          20$:    TST 70000         ;READ HIT; CLOCK STATUS OF NAND GATE
7838                                                    ;OUTPUT TO CMR<8>
7839 040464  013701  177750          MOV CMR,R1        ;SAVE CMR CONTENTS
7840
     040470  000240                  25$:    NOP               ;INSTRUCTION 'JMP 1$' PLACED HERE
     040472  000240                  NOP               ;FOR  LOOP ON ERROR

7841 040474  012737  001015  177746          MOV #OFF,CCR      ;DISABLE CACHE
7842 040502  032701  000400          BIT #HIT,R1       ;WAS CACHE HIT SIGNAL A 1
7843 040506  001003                  BNE 10$           ;PASS
7844
7845
     040510  104000                  ERROR                     ;ERROR
                                                              ;-----
     040512  040510                  .-2
7846                                                    ;CACHE HIT TESTS
7847                                                    ;READING OUTPUT OF CACHE HIT NAND GATE
7848                                                    ;THRU CMR<8> DID NOT RESULT IN A 1
7849 040514  000000                  0
7850                                                            ;;;
7851 040516  000240          10$:    NOP             ;END OF TEST
7852
7853
7854
7855
7856
7857
7858
7859
7860 040520  005237  001464  T212:           INC $TESTN              ;UPDATE TEST ID
                             ;;*****************************************************************
                             .SBTTL
                             .SBTTL TEST 212
                             .SBTTL
7861                         .SBTTL
7862                         .SBTTL  VERIFY THAT AN 'UNCONDITIONAL CACHE BYPASS' WILL INHIBIT CACHE HIT NAND GATE
7863                         .SBTTL  FROM INDICATING A CACHE HIT.
7864                         .SBTTL
7865                         ;;;             PROCEDURE:      CAUSE A READ HIT TO LO CACHE WITH UCB ENABLED
7866                         ;;;                             VERIFY THAT THE OUTPUT OF CACHE HIT NAND GATE
7867                         ;;;                             WILL READ AS A 1 THRU CMR<8>.
7868                         ;;;
7869                         ;;;             CONDITIONS:     INPUTS CACHE HIT NAND GATE:
7870                         ;;;                               COMPARE 1     =1
7871                         ;;;                               COMPARE 2     =1
7872                         ;;;                               COMPARE 3     =1
7873                         ;;;                               VALID         =1
7874                         ;;;                               TAG PAR. ERR  =1
7875                         ;;;                               HI BYTE PE    =1
7876                         ;;;                               LO BYTE PE    =1
7877                         ;;;                               MISS HI       =1
```

```
                                ;;;                             MISS LO         =1
                                ;;;                             BYPASS/WRITE    =0
                                ;;;                             FAULT           =1
                                ;;;
                                ;;*****************************************************************
7883 040524  000004                             SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
     040526  040536                            40$                     ;TEST START LOCATION
     040530  070004                            1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     040532  070036                            20$-40$+70000-14        ;SCOPE SYNC. LOCATION
     040534  070054                            25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     040536  012737  001015  177746    40$:    MOV #OFF,CCR            ;DISABLE CACHE
     040544  004437  002352                    JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     040550  040650                            10$+2                   ;ADDRESS OF START OF NEXT TEST

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

7884 040552  005037  060000                     CLR 60000               ;ALL 0'S TO MAIN MEMORY LOCATION 60000
7885 040556  112737  000002  177750    1$:     MOVB #HODO,CMR          ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AN
7886                                                                    ;CLOCKING OF OUTPUT OF CACHE HIT NAND
7887                                                                    ;GATE INTO CMR ONLY DURING THE DESTINATION
7888                                                                    ;ACCESS OF AN INSTRUCTION.
7889 040564  012737  000011  177746            MOV #11,CCR             ;NO UCB SO AS TO UPDATE CACHE STORES
7890                                                                    ;ENABLE LOW CACHE
7891 040572  005737  040000                     TST 40000               ;
7892 040576  005737  060000                     TST 60000               ;READ UPDATE TO LOW CACHE LOCATION 0000
7893 040602  052737  001000  177746            BIS #UCB,CCR            ;ENABLE UCB
7894 040610  005737  060000    20$:    TST 60000               ;READ HIT; CLOCK STATUS OF NAND GATE
7895                                                                    ;OUTPUT TO CMR<8>
7896 040614  013701  177750                     MOV CMR,R1              ;SAVE CMR CONTENTS
7897 040620  012737  001015  177746            MOV #OFF,CCR            ;DISABLE CACHE
7898
     040626  000240                    25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     040630  000240                            NOP                     ;FOR  LOOP ON ERROR

7899 040632  032701  000400                     BIT #HIT,R1             ;WAS CACHE HIT SIGNAL A 1
7900 040636  001003                            BNE 10$                 ;PASS
7901
7902
     040640  104000                            ERROR                           ;ERROR
                                                                                ;-----
     040642  040640                            .-2
7903                                                                    ;CACHE HIT TESTS
7904                                                                    ;READING OUTPUT OF CACHE HIT NAND GATE
7905                                                                    ;THRU CMR<8> DID NOT RESULT IN A 1
7906 040644  000000                            0
7907                                                                            ;;;
7908 040646  000240    10$:    NOP             ;END OF TEST
7909
7910
7911
7912
7913 040650  005237  001464    T213:           INC $TESTN              ;UPDATE TEST ID
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 213
```

```
                                .SBTTL
                                .SBTTL
                                .SBTTL  VERIFY THAT 'VALID' INPUT TO CACHE HIT NAND GATE WILL INHIBIT NAND
                                .SBTTL  GATE FROM INDICATING A CACHE HIT.
                                .SBTTL
                                ;;;             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
                                ;;;
                                ;;;*****************************************************************
040654  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
040656  040666                            40$                     ;TEST START LOCATION
040660  070012                            1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
040662  070054                            20$-40$+70000-14        ;SCOPE SYNC. LOCATION
040664  070064                            25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
040666  012737  001015  177746      40$:  MOV #OFF,CCR            ;DISABLE CACHE
040674  004437  002352                    JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
040700  041016                            10$+2                   ;ADDRESS OF START OF NEXT TEST

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

040702  005000                            CLR R0                  ;CLEAR R0
040704  005037  060000                    CLR 60000               ;ALL 0'S TO MAIN MEMORY LOC. 60000
040710  012701  060000                    MOV #60000,R1           ;ADDRESS 60000 TO R1
040714  112737  000002  177750      1$:   MOVB #HODO,CMR          ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AN
                                                                ;CLOCKING OF OUTPUT OF CACHE HIT NAND
                                                                ;GATE INTO CMR ONLY DURING THE DESTINATION
                                                                ;ACCESS OF AN INSTRUCTION.
040722  012737  000011  177746            MOV #11,CCR             ;NO UCB SO AS TO WRITE CACHE STORES
                                                                ;ENABLE LO CACHE
040730  005737  040000                    TST 40000               ;
040734  005737  060000                    TST 60000               ;READ UPDATE; ASSURE CORRECT PARITY IS WRITTEN
                                                                ;FOR CACHE LOCATION 0000
040740  052737  001000  177746            BIS #UCB,CCR            ;SET UCB SO AS TO INVALIDATE CACHE LOCATIONS
                                                                ;DURING WRITE HIT
040746  010011                            MOV R0,(R1)             ;CAUSE WRITE HIT TO LOCATION 60000;
                                                                ;UCB CAUSES CACHE LOC. 0000 TO BE INVALIDATED
```

```
7958 040750  042737  001000  177746          BIC #UCB,CCR            ;CLEAR UCB
7959
7960 040756  005737  060000            20$:  TST 60000               ;READ UPDATE CAUSED BY VALID STORE
7961                                         ;INVALIDATED; ALL INPUTS TO CACHE HIT NAND GATE
7962                                         ;ARE 1 EXCEPT VALID.CLOCK STATUS OF NAND GATE
7963                                         ;OUTPUT TO CMR<8>
7964 040762  013702  177750          MOV CMR,R2                 ;SAVE CMR CONTENTS
7965
     040766  000240            25$:  NOP                        ;INSTRUCTION 'JMP 1$' PLACED HERE
     040770  000240                  NOP                        ;FOR  LOOP ON ERROR

7966 040772  012737  001015  177746          MOV #OFF,CCR               ;DISABLE CACHE
7967 041000  032702  000400                  BIT #HIT,R2                ;WAS CACHE HIT SIGNAL A 1
7968 041004  001003                          BNE 10$                    ;PASS
7969
7970
     041006  104000                          ERROR                              ;ERROR
                                                                                ;-----
     041010  041006                          .-2
7971                                         ;CACHE HIT TESTS
7972                                         ;READING OUTPUT OF CACHE HIT NAND GATE
7973                                         ;THRU CMR<8> DID NOT RESULT IN A 1
7974 041012  000000                          0
7975                                                                            ;;;
7976 041014  000240            10$:  NOP                  ;END OF TEST
7977
7978
7979
7980
7981
7982
7983 041016  005237  001464      T214:     INC $TESTN                 ;UPDATE TEST ID
                                 ;;*****************************************************************
                                 .SBTTL
                                 .SBTTL TEST 214
                                 .SBTTL
7984                             .SBTTL
7985                             .SBTTL  VERIFY THA  'COMPARE 1'' INPUT TO CACHE HIT NAND GATE CAN INHIBIT
7986                             .SBTTL  NAND GATE FROM INDICATING A CACHE HIT.
7987                             .SBTTL
7988                             ;;;             PROCEDURE:      CREATE A READ UPDATE TO LOW CACHE  CAUSED BY ONLY
7989                             ;;;                             BIT 18 ON CACHE ADDRESS LINE BEING DIFFERENT
7990                             ;;;                             FROM BIT 18 IN TAG STORE. VERIFY THAT OUTPUT  OF CACHE HIT
7991                             ;;;                             NAND GATE WILL READ AS A 1 THRU CMR<8>.
7992                             ;;;
7993                             ;;;             CONDITIONS:     INPUTS CACHE HIT NAND GATE:
7994                             ;;;                               COMPARE 1     =0
7995                             ;;;                               COMPARE 2     =1
7996                             ;;;                               COMPARE 3     =1
7997                             ;;;                               VALID         =1
7998                             ;;;                               TAG PAR. ERR  =1
7999                             ;;;                               HI BYTE PE    =1
8000                             ;;;                               LO BYTE PE    =1
8001                             ;;;                               MISS HI       =1
8002                             ;;;                               MISS LO       =1
8003                             ;;;                               BYPASS/WRITE  =1
8004                             ;;;                               FAULT         =1
```

```
                                ;;;
                                ;;*****************************************************************
                                        SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
041024  041034                          40$                     ;TEST START LOCATION
041026  070000                          1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
041030  070066                          20$-40$+70000-14        ;SCOPE SYNC. LOCATION
041032  070106                          25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
041034  012737  001015  177746    40$:  MOV #OFF,CCR            ;DISABLE CACHE
041042  004437  002352                  JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
041046  041230                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

8008 041050  012737  070100  000004    1$:  MOV #3$-1$+70000,4      ;SETUP FOR POTENTIAL TRAP
8009 041056  012737  000340  000006         MOV #340,6
8010 041064  012737  010000  172350         MOV #10000,KPAR4        ;MAP PAGE 4 FOR 128K-132K ADDRESSING
8011 041072  012700  100000                 MOV #100000,R0          ;LOAD VIRTUAL ADDRESS IN R0.WHEN MEMORY
8012                                                                 ;MANAGEMENT IS ENABLED,PAGE 4 WILL
8013                                                                 ;BE SELECTED AND ADDRESS 10000000
8014                                                                 ;WILL BE ACCESSED.
8015 041076  012737  000001  177572         MOV #1,SR0              ;ENABLE MEM. MNGMENT.
8016 041104  012737  000020  172516         MOV #20,SR3             ;ENABLE 22-BIT MAPPING
8017
8018 041112  112737  000002  177750         MOVB #HODO,CMR          ;HODO ALLOWS READ HITS,UPDATES, AND
8019                                                                 ;CLOCKING OF OUTPUT OF CACHE HIT NAND
8020                                                                 ;GATE INTO CMR ONLY DURING THE DESTINATION
8021                                                                 ;ACCESS OF AN INSTRUCTION.
8022 041120  012737  000011  177746         MOV #11,CCR             ;NO UCB SO AS TO WRITE CACHE STORES
8023                                                                 ;ENABLE LOW CACHE
8024 041126  005737  040000                 TST 40000               ;
8025 041132  005737  000000                 TST 0                   ;READ UPDATE; ASSURE ALL 0'S IN TAG STORE
8026                                                                 ;LOCATION 0000,AND CORRECT PARITY IS WRITTEN.
8027 041136  005710                 20$:    TST (R0)                ;READ UPDATE TO CACHE LOCATION 0000
8028                                                                 ;CAUSED BY BIT 18 ON CACHE ADDRESS LINE
8029                                                                 ;DIFFERENT FROM TAG STORE BIT 18.
8030                                                                 ; CLOCK STATUS OF NAND GATE
8031                                                                 ;OUTPUT TO CMR<8>
8032 041140  000240                         NOP
8033 041142  013701  177750                 MOV CMR,R1              ;SAVE CMR CONTENTS
8034 041146  000403                         BR 25$
8035 041150  013701  177750         3$:     MOV CMR,R1              ;IF TRAP OCCURS WILL RETURN HERE
8036 041154  022626                         CMP (SP)+,(SP)+         ;ADJUST STACK AND VECTORS
8037
041156  000240                      25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
041160  000240                              NOP                     ;FOR  LOOP ON ERROR

8038 041162  005037  177572                 CLR SR0                 ;DISABLE MEM. MNGMENT.
8039 041166  005037  172516                 CLR SR3                 ;DISABLE 22 BIT MAPPING
8040 041172  012737  001015  177746         MOV #OFF,CCR            ;DISABLE CACHE
8041 041200  012737  000006  000004         MOV #6,@#4              ;RESTORE VECTORS
8042 041206  005037  000006                 CLR @#6
8043 041212  032701  000400                 BIT #HIT,R1             ;WAS CACHE HIT SIGNAL A 1
8044 041216  001003                         BNE 10$                 ;PASS
8045
8046
```

```
                041220  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                041222  041220                          .-2
 8047                                                                   ;CACHE HIT TESTS
 8048                                                                   ;READING OUTPUT OF CACHE HIT NAND GATE
 8049                                                                   ;THRU CMR<8> DID NOT RESULT IN A 1
 8050           041224  000000                          0
 8051                                                                   ;;;
 8052           041226  000240                  10$:    NOP             ;END OF TEST
 8053
 8054
 8055
 8056
 8057
 8058           041230  005237  001464          T215:   INC $TESTN              ;UPDATE TEST ID
                                                ;;*****************************************************************
                                                .SBTTL
                                                .SBTTL TEST 215
                                                .SBTTL
 8059                                           .SBTTL
 8060                                           .SBTTL  VERIFY THAT 'COMPARE 2'' INPU TTO CACHE HIT NAND GATE CAN INHIBIT
 8061                                           .SBTTL  NAND GATE FROM INDICATING A CACHE HIT.
 8062                                           .SBTTL
 8063                                           ;;;             PROCEDURE:      CREATE A READ UPDATE TO LOW CACHE  CAUSED BY ONLY
 8064                                           ;;;                             BIT 14 ON CACHE ADDRESS LINE BEING DIFFERENT
 8065                                           ;;;                             FROM BIT 14 IN TAG STORE. VERIFY THAT OUTPUT  OF CACHE HIT
 8066                                           ;;;                             NAND GATE WILL READ AS A 1 THRU CMR<8>.
 8067                                           ;;;
 8068                                           ;;;             CONDITIONS:     INPUTS CACHE HIT NAND GATE:
 8069                                           ;;;                               COMPARE 1     =1
 8070                                           ;;;                               COMPARE 2     =0
 8071                                           ;;;                               COMPARE 3     =1
 8072                                           ;;;                               VALID         =1
 8073                                           ;;;                               TAG PAR. ERR  =1
 8074                                           ;;;                               HI BYTE PE    =1
 8075                                           ;;;                               LO BYTE PE    =1
 8076                                           ;;;                               MISS HI       =1
 8077                                           ;;;                               MISS LO       =1
 8078                                           ;;;                               BYPASS/WRITE  =1
 8079                                           ;;;                               FAULT         =1
 8080                                           ;;;
 8081                                           ;;*****************************************************************
 8082           041234  000004                          SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                        ;ERROR/LOOP ON TEST
                041236  041246                          40$                             ;TEST START LOCATION
                041240  070000                          1$-40$+70000-14                 ;LOOP ON ERROR START LOCATION
                041242  070024                          20$-40$+70000-14                ;SCOPE SYNC. LOCATION
                041244  070034                          25$-40$+70000-14                ;LOOP ON ERROR END LOCATION
                041246  012737  001015  177746  40$:    MOV #OFF,CCR                    ;DISABLE CACHE
                041254  004437  002352                  JSR R4,RELCTH                   ;LOCATE TEST CODE TO HIGH CACHE SPACE
                041260  041346                          10$+2                           ;ADDRESS OF START OF NEXT TEST

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

 8083           041262  112737  000002  177750  1$:     MOVB #HODO,CMR                  ;HODO ALLOWS READ HITS,UPDATES, AND
 8084                                                                                   ;CLOCKING OF OUTPUT OF CACHE HIT NAND
```

```
8085                                                    ;GATE INTO CMR ONLY DURING THE DESTINATION
8086                                                    ;ACCESS OF AN INSTRUCTION.
8087 041270  012737  000011  177746          MOV #11,CCR  ;NO UCB SO AS TO WRITE CACHE STORES
8088                                                    ;ENABLE LOW CACHE
8089 041276  005737  040000                  TST 40000    ;
8090 041302  005737  000000                  TST 0        ;READ UPDATE; ASSURE ALL 0'S IN TAG STORE
8091                                                    ;LOCATION 0000,AND CORRECT PARITY IS WRITTEN.
8092 041306  005737  040000          20$:    TST 40000    ;READ UPDATE TO CACHE LOCATION 0000
8093                                                    ;CAUSED BY BIT 14 ON CACHE ADDRESS LINE
8094                                                    ;DIFFERENT FROM TAG STORE BIT 14.
8095                                                    ; CLOCK STATUS OF NAND GATE
8096                                                    ;OUTPUT TO CMR<8>
8097 041312  013701  177750                  MOV CMR,R1   ;SAVE CMR CONTENTS
8098
     041316  000240          25$:    NOP                  ;INSTRUCTION 'JMP 1$' PLACED HERE
     041320  000240                  NOP                  ;FOR  LOOP ON ERROR

8099 041322  012737  001015  177746          MOV #OFF,CCR ;DISABLE CACHE
8100 041330  032701  000400                  BIT #HIT,R1  ;WAS CACHE HIT SIGNAL A 1
8101 041334  001003                          BNE 10$      ;PASS
8102
8103
     041336  104000                  ERROR                        ;ERROR
                                                                  ;-----
     041340  041336                  .-2
8104                                                    ;CACHE HIT TESTS
8105                                                    ;READING OUTPUT OF CACHE HIT NAND GATE
8106                                                    ;THRU CMR<8> DID NOT RESULT IN A 1
8107 041342  000000                  0
8108                                                                ;;;
8109 041344  000240          10$:    NOP          ;END OF TEST
8110
8111
8112
8113
8114
8115
8116 041346  005237  001464          T216:           INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 216
                                     .SBTTL
8117                                 .SBTTL
8118                                 .SBTTL  VERIFY THAT 'COMPARE 3' INPUT TO CACHE NAND GATE WILL INHIBIT NAND GATE
8119                                 .SBTTL  FROM INDICATING A CACH HIT.
8120                                 .SBTTL
8121                                 ;;;             PROCEDURE:      CREATE A READ UPDATE TO LO CACHE CAUSED BY
8122                                 ;;;                             ONLY  BIT 13 ON CACHE ADDRESS LINE BEING
8123                                 ;;;                             DIFFERENT FROM BIT 13 IN TAG STORE.
8124                                 ;;;                             VERIFY THAT THE OUTPUT OF CACHE HIT NAND GATE
8125                                 ;;;                             WILL READ AS A 1 THRU CMR<8>.
8126                                 ;;;
8127                                 ;;;             CONDITIONS:     INPUTS CACHE HIT NAND GATE:
8128                                 ;;;                               COMPARE 1     =1
8129                                 ;;;                               COMPARE 2     =1
8130                                 ;;;                               COMPARE 3     =0
8131                                 ;;;                               VALID         =1
```

```
8132                                    ;;;                     TAG PAR. ERR  =1
8133                                    ;;;                     HI BYTE PE    =1
8134                                    ;;;                     LO BYTE PE    =1
8135                                    ;;;                     MISS HI       =1
8136                                    ;;;                     MISS LO       =1
8137                                    ;;;                     BYPASS/WRITE  =1
8138                                    ;;;                     FAULT         =1
8139                                    ;;;
8140                                    ;;**************************************************************************
8141 041352  000004                                   SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                                ;ERROR/LOOP ON TEST
      041354  041364                                   40$                     ;TEST START LOCATION
      041356  070000                                   1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
      041360  070024                                   20$-40$+70000-14        ;SCOPE SYNC. LOCATION
      041362  070034                                   25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
      041364  012737  001015  177746           40$:    MOV #OFF,CCR            ;DISABLE CACHE
      041372  004437  002352                           JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
      041376  041464                                   10$+2                   ;ADDRESS OF START OF NEXT TEST

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

8142 041400  112737  000002  177750           1$:     MOVB #HODO,CMR          ;HODO ALLOWS READ HITS,UPDATES, AND
8143                                                                            ;CLOCKING OF OUTPUT OF CACHE HIT NAND
8144                                                                            ;GATE INTO CMR ONLY DURING THE DESTINATION
8145                                                                            ;ACCESS OF AN INSTRUCTION.
8146 041406  012737  000011  177746                   MOV #11,CCR             ;NO UCB SO AS TO UPDATE CACHE STORES
8147                                                                            ;ENABLE LOW CACHE
8148 041414  005737  020000                           TST 20000               ;
8149 041420  005737  000000                           TST 0                   ;READ UPDATE; ASSURE ALL 0'S IN TAG
8150                                                                            ;STORE LOCATION 0000 AND CORRECT PARITY
8151                                                                            ;IS WRITTEN.
8152 041424  005737  020000           20$:    TST 20000               ;READ UPDATE TO CACHE LOC. 0000 CAUSED BY
8153                                                                            ;BIT 13 ON CACHE ADDRESS LINES BEING
8154                                                                            ;DIFFERENT FROM BIT 13 IN TAG STORE.
8155                                                                            ;CLOCK STATUS OF CACHE HIT NAND GATE
8156                                                                            ;OUTPUT TO CMR<8>
8157 041430  013701  177750                           MOV CMR,R1              ;SAVE CMR CONTENTS
8158
      041434  000240                           25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      041436  000240                                   NOP                     ;FOR  LOOP ON ERROR

8159 041440  012737  001015  177746                   MOV #OFF,CCR            ;DISABLE CACHE
8160 041446  032701  000400                           BIT #HIT,R1             ;WAS CACHE HIT SIGNAL A 1
8161 041452  001003                                   BNE 10$                 ;PASS
8162
8163
      041454  104000                                   ERROR                           ;ERROR
                                                                                        ;-----
      041456  041454                                   .-2
8164                                                                            ;CACHE HIT TESTS
8165                                                                            ;READING OUTPUT OF CACHE HIT NAND GATE
8166                                                                            ;THRU CMR<8> DID NOT RESULT IN A 1
8167 041460  000000                                   0
8168                                                                                    ;;;
8169 041462  000240           10$:    NOP             ;END OF TEST
8170
```

```
8171
8172
8173                                    .SBTTL *
8174                                    .SBTTL
8175                                    .SBTTL *                CPU CLOCK RESTART TESTS-CACHED DATA FROM CACHE DATA STORE
8176                                    .SBTTL
8177                                    .SBTTL *
8178
8179
8180
8181
8182
8183
8184 041464  005237  001464            T217:           INC $TESTN              ;UPDATE TEST ID
                                        ;;*****************************************************************
                                        .SBTTL
                                        .SBTTL TEST 217
                                        .SBTTL
8185                                    .SBTTL  VERIFY THAT A CACHE READ HIT WILL RESULT IN DATA BEING READ
8186                                    .SBTTL  FROM CACHE DATA STORE, ASSURING THAT THE CACHE HAS ISSUED A
8187                                    .SBTTL  A CPU CLOCK RESTART SIGNAL.  ASSURE THAT ALL 0'S CAN BE CACHED
8188                                    .SBTTL  OUT OF CACHE DATA STORE.
8189                                    .SBTTL
8190                                    ;;*****************************************************************
8191 041470  000004                            SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                        ;ERROR/LOOP ON TEST
      041472  041502                            40$                     ;TEST START LOCATION
      041474  070000                            1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
      041476  000000                            0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      041500  070106                            25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
      041502  012737  001015  177746    40$:    MOV #OFF,CCR            ;DISABLE CACHE
      041510  004437  002352                    JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
      041514  041746                            10$+2                   ;ADDRESS OF START OF NEXT TEST

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

8192 041516  012701  040000    1$:     MOV #40000,R1           ;ADDRESS 40000 TO R1
8193 041522  012702  060000            MOV #60000,R2           ;ADDRESS 60000 TO R2
8194 041526  012737  070076  000014    MOV #3$-1$+70000,14             ;SETUP BPT TRAP VECTORS
8195 041534  012737  000340  000016    MOV #340,16
8196 041542  005037  002060            CLR FAIL1               ;CLEAR ERROR FLAGS
8197 041546  005037  002062            CLR FAIL2
8198 041552  012706  060002            MOV #60002,SP           ;STACK POINTER NOW POINTS TO ADDRESS 60002
8199 041556  005037  060000            CLR 60000               ;PRECONDITION MAIN MEMORY ADDRESS LOCATION
8200                                                            ;60000 WITH ALL 0'S
8201 041562  012737  000340  177776    MOV #340,PSW            ;PRECONDITION PSW TO 340
8202 041570  112737  000002  177750    MOVB #HODO,CMR          ;HODO WILL ALLOW READ HITS AND UPDATES
8203                                                            ;ONLY DURING THE DESTINATION MEMORY ACCESS
8204                                                            ;OF AN INSTRUCTION.
8205                                                            ;HODO DOES NOT ALLOW A CACHE UPDATE
8206                                                            ;TO OCCUR DUE TO WRITE UPDATES.
8207 041576  012737  000011  177746    MOV #11,CCR             ;NO BYPASS TO ALLOW WRITES TO CACHE STORES.
8208                                                            ;ENABLE LOW CACHE
8209 041604  000257                    CCC                     ;CLEAR ALL CONDITION CODES
8210 041606  005711                    TST (R1)                ;
8211 041610  005712                    TST (R2)                ;CACHE READ UPDATE. WRITE ALL 0'S FROM
```

```
8212                                                    ;MAIN MEMORY LOCATION TO CACHE DATA STORE
8213                                                    ;LOCATION 0000.
8214 041612  000003                     BPT            ;BREAKPOINT TRAP. DUE TO A TRAP,THE  PSW
8215                                                    ;WILL BE WRITTEN TO THE STACK, WHICH NOW
8216                                                    ;POINTS TO ADDRESS 60000.THE TRAP INSTRUCTION
8217                                                    ;IS A NON-DESTINATION ACCESS INSTR.
8218                                                    ;SINCE HODO IS BEING USED, A CACHE UPDATE
8219                                                    ;WILL BE INHIBITED. MAIN MEMORY
8220                                                    ;ADDRESS 60000 WILL CONTAIN PSW  DATA OF 344,AND
8221                                                    ;THE LOCATION IN CACHE CORRESPONDING TO ADDRESS
8222                                                    ;60000 WILL BE LEFT WITH ALL 0'S DATA.
8223 041614  042737  000002  177750   3$:    BIC #HODO,CMR  ;TRAP TO HERE;DISABLE HODO
8224 041622  011200                     MOV (R2),R0    ; WHEN THIS INSTRUCTION READS
8225                                                    ;ADDRESS 60000
8226                                                    ;A CACHE READ HIT SHOULD RESULT AND A CPU CLOCK
8227                                                    ;RESTART SIGNAL SHOULD BE ISSUED.
8228                                                    ;THE CPU SHOULD READ DATA FROM CACHE DATA STORE
8229                                                    ;RATHER THAN MAIN MEMORY.
8230
     041624  000240                25$:    NOP            ;INSTRUCTION 'JMP 1$' PLACED HERE
     041626  000240                        NOP            ;FOR  LOOP ON ERROR

8231 041630  005700                        TST R0         ;R0 SHOULD CONTAIN ALL 0'S
8232 041632  001410                        BEQ 7$         ;
8233 041634  022700  000344               CMP #344,R0    ;DID THE CPU READ MAIN MEMORY?
8234 041640  001003                        BNE 6$         ;NO,MUST HAVE READ CACHE BUT BAD DATA WAS RECEIVED.
8235 041642  005237  002060               INC FAIL1      ;INDICATE ERROR THAT MAIN MEMORY WAS READ
8236 041646  000402                        BR 7$
8237 041650  005237  002062        6$:    INC FAIL2      ;INDICATE ERROR THAT DATA WAS CACHED BUT
8238                                                    ;BAD DATA WAS RECEIVED.
8239 041654  105037  177750        7$:    CLRB CMR       ;DISABLE MAINTENANCE MODE
8240 041660  012737  001015  177746      MOV #OFF,CCR   ;DISABLE CACHE
8241 041666  012706  000500               MOV #500,SP    ;RESET STACK POINTER
8242 041672  012737  000016  000014      MOV #16,14     ;RESTORE BPT VECTORS
8243 041700  005037  000016               CLR 16
8244 041704  005737  002060               TST FAIL1      ;WAS MAIN MEMORY READ?
8245 041710  001404                        BEQ 8$         ;NO
8246
     041712  104000                        ERROR                  ;ERROR
                                                                    ;-----
     041714  041712                        .-2
8247                                                    ;CPU CLOCK RESTART-CACHED DATA TESTS
8248
8249                                                    ;ATTEMPTING TO CAUSE A READ HIT IN ORDER TO
8250                                                    ;CACHE DATA RESULTED IN MAIN MEMORY BEING READ
8251 041716  000000                        0
8252 041720  000411                        BR 10$         ;NEXT TEST
8253                                ;;;
8254 041722  005737  002062        8$:    TST FAIL2      ;WAS BAD DATA CACHED FROM CACHE DATA STORE?
8255 041726  001406                        BEQ 10$        ;NO, NEXT TEST
8256 041730  010037  047334               MOV R0,RECDAT  ;SPECIFY DATA RECEIVED
8257
     041734  104000                        ERROR                  ;ERROR
                                                                    ;-----
     041736  041734                        .-2
8258                                                    ;CPU CLOCK RESTART-CACHED DATA TESTS
8259
```

```
8260                                                    ;CREATING A READ HIT BY READING ADDRESS 60000
8261                                                    ;CACHED BAD DATA FROM CACHE DATA STORE
8262 041740  047334                        RECDAT       ;PRINT DATA RECEIVED
8263 041742  000000                        0
8264                                ;;;
8265 041744  000240                 10$:   NOP          ;END OF TEST
8266
8267
8268
8269
8270 041746  005237  001464        T220:  INC $TESTN    ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 220
                                    .SBTTL
8271                                .SBTTL  VERIFY THAT A FLOATING 1 ACROSS 0'S DATA PATTERN CAN BE CACHED
8272                                .SBTTL  FROM CACHE DATA STORE.
8273                                .SBTTL
8274                                ;;*****************************************************************
8275 041752  000004                        SCPCND       ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                         ;ERROR/LOOP ON TEST
      041754  041764                        40$          ;TEST START LOCATION
      041756  070016                        1$-40$+70000-14  ;LOOP ON ERROR START LOCATION
      041760  000000                        0            ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      041762  070040                        25$-40$+70000-14 ;LOOP ON ERROR END LOCATION
      041764  012737  001015  177746 40$:   MOV #OFF,CCR  ;DISABLE CACHE
      041772  004437  002352               JSR R4,RELCTH  ;LOCATE TEST CODE TO HIGH CACHE SPACE
      041776  042114                        10$+2        ;ADDRESS OF START OF NEXT TEST

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

8276 042000  012701  040000                MOV #40000,R1  ;ADDRESS 40000 TO R1
8277 042004  012702  060000                MOV #60000,R2  ;ADDRESS 60000 TO R2
8278 042010  012737  000001  047332        MOV #1,FLTPAT  ;1ST FLOATING 1 PATTERN: 000001
8279 042016  013737  047332  060000 1$:    MOV FLTPAT,60000 ;WRITE FLOATING 1 PATTERN TO MAIN MEMORY
8280                                                     ;LOCATION 60000
8281 042024  012737  000011  177746        MOV #11,CCR    ;NO BYPASS TO ALLOW WRITES TO CACHE STORES.
8282                                                     ;ENABLE LOW CACHE
8283 042032  005711                        TST (R1)       ;
8284 042034  005712                        TST (R2)       ;CACHE READ UPDATE. WRITE FLOATING 1 PATTERN FROM
8285                                                     ;MAIN MEMORY LOCATION TO CACHE DATA STORE
8286                                                     ;LOCATION 0000.
8287 042036  011200                        MOV (R2),R0    ;WHEN THIS INSTRUCTION READS
8288                                                     ;ADDRESS 60000,A CACHE READ HIT SHOULD RESULT
8289                                                     ;AND A CPU CLOCK RESTART SIGNAL SHOULD BE ISSUED.
8290                                                     ;THE CPU SHOULD READ FLOATING 1 PATTERN FROM CACHE D
8291                                                     ;RATHER THAN MAIN MEMORY.
8292
      042040  000240                 25$:   NOP          ;INSTRUCTION 'JMP 1$' PLACED HERE
      042042  000240                        NOP          ;FOR  LOOP ON ERROR

8293
8294 042044  012737  001015  177746        MOV #OFF,CCR   ;DISABLE CACHE
8295 042052  020037  047332                CMP R0,FLTPAT  ;WAS THE CORRECT FLOATING 1 PATTERN RECEIVED
8296 042056  001412                        BEQ 9$         ;PASS
8297
```

```
8298 042060  010037  047334                    MOV R0,RECDAT          ;GET DATA RECEIVED
8299 042064  013737  047332  047320            MOV FLTPAT,EXDAT6      ;GET EXPECTED DATA
8300
     042072  104000                            ERROR                          ;ERROR
                                                                               ;-----
     042074  042072                            .-2
8301                                           ;CPU CLOCK RESTART-CACHED DATA TESTS
8302
8303     .                                     ;CREATING A READ HIT BY READING ADDRESS 60000
8304                                           ;RESULTED IN INCORRECT FLOATING 1 PATTERN
8305                                           ;BEING CACHED FROM CACHE DATA STORE
8306 042076  047320                            EXDAT6                         ;PRINT FLOATING 1 PATTERN EXPECTED FROM THE
8307                                                                          ;READ HIT TO ADDRESS 60000
8308 042100  047334                            RECDAT                         ;PRINT DATA RECEIVED FROM READ HIT TO ADDRESS 60000
8309 042102  000000                            0
8310                                  ;;;
8311 042104  006337  047332            9$:     ASL FLTPAT                     ;NEXT FLOATING 1 PATTERN
8312 042110  103342                            BCC 1$                         ;IF FLOATING 1 PATTERN 100000 HAS NOT BEEN
8313                                                                          ;DONE ,CONTINUE.
8314 042112  000240                    10$:    NOP                ;END OF TEST
8315
8316
8317
8318
8319
8320                                  .SBTTL *
8321                                  .SBTTL
8322                                  .SBTTL *              UNIBUS EXERCISER DMA TESTS
8323                                  .SBTTL;               -------------------------
8324                                  .SBTTL
8325                                  .SBTTL *
8326
8327
8328
8329
8330 042114  005237  001464          T221:          INC $TESTN              ;UPDATE TEST ID
                                      ;;*****************************************************************
                                      .SBTTL
                                      .SBTTL TEST 221
                                      .SBTTL
8331                                  .SBTTL
8332                                  .SBTTL  VERIFY THAT DMA WRITE HITS WILL INVALIDATE ALL OF LOW CACHE VALID
8333                                  .SBTTL  STORE LOCATIONS.
8334                                  .SBTTL
8335                                  ;;*****************************************************************
8336 042120  000004                            SCPCND                         ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                               ;ERROR/LOOP ON TEST
     042122  042132                            40$                            ;TEST START LOCATION
     042124  070270                            1$-40$+70000-14                ;LOOP ON ERROR START LOCATION
     042126  000000                            0                              ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     042130  070410                            25$-40$+70000-14               ;LOOP ON ERROR END LOCATION
     042132  012737  001015  177746    40$:    MOV #OFF,CCR                   ;DISABLE CACHE
     042140  004437  002352                    JSR R4,RELCTH                  ;LOCATE TEST CODE TO HIGH CACHE SPACE
     042144  042644                            10$+2                          ;ADDRESS OF START OF NEXT TEST

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

```
8337 042146  032737  020000  177746          BIT #VSIU,CCR          ;IS SET A BEING USED?
8338 042154  001407                          BEQ 7$                 ;YES
8339 042156  052737  000400  177746          BIS #FC,CCR            ;NO; FLUSH CACHE FOR SET A
8340 042164  032737  010000  177746          BIT #VCIP,CCR          ;WAIT TILL FLUSH COMPLETE
8341 042172  001374                          BNE .-6
8342 042174  012705  060000            7$:   MOV #60000,R5          ;;ADDRESS 60000 INTO R5
8343 042200  012703  040000                  MOV #40000,R3          ;ADDRESS 40000 INTO R3
8344
8345 042204  132737  000200  001501          BITB #APTSIZE,$ENVM     ;WILL APT SIZE?
8346 042212  001405                          BEQ 3$                 ;NO,GO AUTOSIZE
8347 042214  032737  010000  001504          BIT #10000,$USWR       ;DOES APT SAY TO PERFORM TEST
8348 042222  001426                          BEQ 11$                ;APT SAYS DO NOT PERFORM TEST
8349 042224  000504                          BR 1$                  ;APT SAYS DO TEST
8350
8351 042226  012737  070116  000004    3$:   MOV #5$-40$+67764,4    ;SETUP FOR TRAP
8352 042234  012737  000340  000006          MOV #340,6
8353 042242  005737  170006                  TST BECR1              ;ACCESS UNIBUS EXERCISER
8354 042246  000240                          NOP
8355 042250  012737  000006  000004          MOV #6,@#4             ;RESTORE VECTORS
8356 042256  005037  000006                  CLR @#6
8357 042262  000465                          BR 1$                  ;UNIBUS EXERCISER IS PRESENT;PROCEED
8358                                                                 ;WITH TEST
```

```
8360 042264  022626                    5$:   CMP (SP)+,(SP)+          ;TRAP RETURN;EXERCISER NOT PRESENT
8361 042266  012737  000006  000004          MOV #6,4                 ;RESTORE VECTORS
8362 042274  005037  000006                  CLR 6
8363 042300  005737  001466            11$:  TST $PASS                ;IS THI SFIRST PASS?
8364 042304  001156                          BNE 10$                  ;SKIP MESSAGE;SKIP TEST
8365 042306  023737  000042  000046          CMP @#42,@#46            ;IS THIS ACT11 QV OR AUTO ACCEPT?
8366 042314  001552                          BEQ 10$                  ;YES SKIP TYPEOUT
8367 042316  104401  042324                  TYPE  ,65$           ;;TYPE ASCIZ STRING
     042322  000402                          BR    64$            ;;GET OVER THE ASCIZ
                                      ;;65$:  .ASCIZ <CRLF><CRLF>
     042330                           64$:
8368 042330  104401  042336                  TYPE  ,67$           ;;TYPE ASCIZ STRING
     042334  000432                          BR    66$            ;;GET OVER THE ASCIZ
                                      ;;67$:  .ASCIZ /UNIBUS  EXERCISER NOT USED- DMA TESTS NOT PERFORMED/
     042422                           66$:
8369 042422  104401  042430                  TYPE  ,69$           ;;TYPE ASCIZ STRING
     042426  000402                          BR    68$            ;;GET OVER THE ASCIZ
                                      ;;69$:  .ASCIZ <CRLF><CRLF>
     042434                           68$:
8370 042434  000502                          BR 10$
8371
8372 042436  012737  000015  177746    1$:   MOV #15,CCR              ;NO UCB SO AS TO WRITE ENABLE VALID STORE
8373 042444  112737  000002  177750          MOVB #HODO,CMR           ;HODO ALLOWS UPDATES ONLY DURING THE
8374                                          ;DESTINATION ACCESS OF AN INSTRUCTION
8375 042452  005723                    2$:   TST (R3)+
8376 042454  005725                          TST (R5)+                ;UPDATE ALL LOW CACHE LOCATIONS MAKING
8377                                          ;ALL VALID STORE  LOCATIONS =1
8378 042456  022705  070000                  CMP #70000,R5            ;COMPLETE?
8379 042462  001373                          BNE 2$                   ;NO
8380
8381 042464  042737  000002  177750          BIC #HODO,CMR            ;CLEAR HODO SO VALID STORE CAN BE WRITTEN
8382                                          ;BY UNIBUS EXERCISER.
8383 042472  012705  060000                  MOV #60000,R5            ;ADDRESS 60000 INTO R5
8384 042476  012737  060000  170004          MOV #60000,BEBA          ;SETUP UNIBUS EXERCISER
8385                                          ;ADRESS
8386 042504  012737  174000  170002          MOV #-4000,BECC          ;TRANSFER COUNT
8387 042512  012737  177777  170000          MOV #177777,BEDA         ;DATA FOR WRITE XFER
8388 042520  012737  000000  170016          MOV #0,BECR2             ;SETUP CONTROL REGISTER 2
8389 042526  012737  003045  170006          MOV #3045,BECR1          ;SETUP CONTROL REGISTER 1;START XFER
8390 042534  105737  170006            4$:   TSTB BECR1               ;WAIT FOR EXERCISER TO COMPLETE
8391 042540  100375                          BPL 4$
8392 042542  052737  000002  177750    6$:   BIS #HODO,CMR            ;IMPLEMENT HODO. ALLOWS VALID STORE
8393                                          ;DATA TO BE WRITTEN TO CMR<12> ONLY
8394                                          ;DURING THE DESTINATION MEMORY ACCESS
8395                                          ;OF AN INSTRUCTION.
8396
8397 042550  005715                          TST (R5)                 ;READ LOW CACHE ADDRESS
8398                                          ;LOCATION SPECIFIED BY R5'S BITS 12 TO 1.
8399                                          ;WRITE VALID STORE DATA INTO CMR<12>
8400                                          ;FROM VALID STORE ADDRESS LOCATION
8401                                          ;JUST READ.
8402 042552  013701  177750                  MOV CMR,R1               ;SAVE CMR DATA
8403
     042556  000240                  25$:   NOP                      ;INSTRUCTION 'JMP 1$' PLACED HERE
     042560  000240                         NOP                      ;FOR  LOOP ON ERROR

8404 042562  012737  001015  177746          MOV #OFF,CCR             ;DISABLE CACHE
```

```
8405 042570  105037  177750                    CLRB CMR                ;DISABLE MAINTENANCE
8406 042574  032701  010000                    BIT #VLD,R1             ;CMR<12> SHOULD BE 0.
8407 042600  001411                            BEQ 9$                  ;PASS
8408
8409 042602  010537  047322                    MOV R5,CA121            ;SAVE VALID STORE ADDRESS LOCATION
8410                                                                   ;USED: CA<12:1>
8411 042606  006237  047322                    ASR CA121               ;PREPARE CA121 FOR TYPEOUT
8412
     042612  104000                            ERROR                           ;ERROR
                                                                               ;-----
     042614  042612                            .-2
8413                                                                   ;DMA TESTS
8414                                                                   ;READING VALID STORE DATA
8415                                                                   ;THRU CMR<12> DID NOT RESULT IN 0.
8416                                                                   ;THIS INDICATES THAT VALID STORE WAS
8417                                                                   ;NOT INVALIDATED DUE TO DMA WRITE HIT.
8418 042616  047322                            CA121                   ;PRINT VALID STORE ADDRESS LOCATION
8419                                                                   ;USED: CA<12:1>.
8420 042620  000000                            0
8421 042622  000407                            BR 10$                  ;IF ERROR END TEST
8422 042624  062705  000002              9$:   ADD #2,R5               ;NEXT VALID STORE LOCATION
8423 042630  062703  000002                    ADD #2,R3
8424 042634  020527  070000                    CMP R5,#70000           ;HAVE ALL LOW CACHE ADDRESS LOCATIONS
8425                                                                   ;BEEN DONE?
8426 042640  001340                            BNE 6$                  ;NO
8427 042642  000240                      10$:  NOP             ;END OF TEST
8428
8429
8430
8431
8432 042644  005237  001464          T222:     INC $TESTN              ;UPDATE TEST ID
                                               ;;*****************************************************************
                                               .SBTTL
                                               .SBTTL TEST 222
                                               .SBTTL
8433                                           .SBTTL
8434                                           .SBTTL          VERIFY THAT A DMA WRITE TO CCR REGISTER WILL RESULT IN A TIMEOUT
8435                                           .SBTTL          AND THAT THE CCR REGISTER WILL NOT BE ALTERED
8436                                           .SBTTL
8437                                           ;;*****************************************************************
8438 042650  000004                                    SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                               ;ERROR/LOOP ON TEST
     042652  042662                                    40$                     ;TEST START LOCATION
     042654  070134                                    1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     042656  000000                                    0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     042660  070276                                    25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     042662  012737  001015  177746          40$:     MOV #OFF,CCR            ;DISABLE CACHE
     042670  004437  002352                          JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
     042674  043240                                    10$+2                   ;ADDRESS OF START OF NEXT TEST

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

8439 042676  032737  020000  177746                    BIT #VSIU,CCR           ;IS SET A BEING USED?
8440 042704  001407                                    BEQ 7$                  ;YES
8441 042706  052737  000400  177746                    BIS #FC,CCR             ;NO; FLUSH CACHE FOR SET A
8442 042714  032737  010000  177746                    BIT #VCIP,CCR           ;WAIT TILL FLUSH COMPLETE
```

```
8443 042722  001374                        BNE .-6
8444 042724  012705  060000          7$:   MOV #60000,R5          ;;ADDRESS 60000 INTO R5
8445 042730  012703  040000                MOV #40000,R3          ;ADDRESS 40000 INTO R3
8446
8447 042734  132737  000200  001501        BITB #APTSIZE,$ENVM    ;WILL APT SIZE?
8448 042742  001405                        BEQ 3$                 ;NO,GO AUTOSIZE
8449 042744  032737  010000  001504        BIT #10000,$USWR       ;DOES APT SAY TO PERFORM TEST
8450 042752  001426                        BEQ 11$                ;APT SAYS DO NOT PERFORM TEST
8451 042754  000426                        BR 1$                  ;APT SAYS DO TEST
8452
8453 042756  012737  070116  000004  3$:   MOV #5$-40$+67764,4    ;SETUP FOR TRAP
8454 042764  012737  000340  000006        MOV #340,6
8455 042772  005737  170006                TST BECR1              ;ACCESS UNIBUS EXERCISER
8456 042776  000240                        NOP
8457 043000  012737  000006  000004        MOV #6,@#4             ;RESTORE VECTORS
8458 043006  005037  000006                CLR @#6
8459 043012  000407                        BR 1$                  ;UNIBUS EXERCISER  IS PRESENT;PROCEED
8460                                                               ;WITH TEST
8461 043014  022626                  5$:   CMP (SP)+,(SP)+        ;TRAP RETURN;EXERCISER NOT PRESENT
8462 043016  012737  000006  000004        MOV #6,4               ;RESTORE VECTORS
8463 043024  005037  000006                CLR 6
8464 043030                          11$:
8465 043030  000502                        BR 10$                 ;SKIP TEST
8466
8467 043032  012737  000015  177746  1$:   MOV #15,CCR             ;CACHE OFF-DISABLE INTERRUPT
8468 043040  012737  070256  000510        MOV #6$-40$+67764,510  ;SETUP RETURN ADDRESS FOR
8469                                                               ;A UNIBUS EXER, TRAP
8470 043046  012737  000340  000512        MOV #340,512           ;
8471 043054  012737  177746  170004        MOV #177746,BEBA       ;SETUP UNIBUS EXERCISER
8472                                                               ;ADRESS
8473 043062  012737  177777  170002        MOV #-1,BECC           ;TRANSFER COUNT
8474 043070  012737  001015  170000        MOV #1015,BEDA         ;DATA FOR WRITE XFER
8475 043076  012737  000003  170016        MOV #3,BECR2           ;SETUP CONTROL REGISTER 2
8476 043104  012737  003045  170006        MOV #3045,BECR1        ;SETUP CONTROL REGISTER 1;START XFER
8477 043112  105737  170006          4$:   TSTB BECR1             ;WAIT FOR EXERCISER TO COMPLETE
8478 043116  100375                        BPL 4$
8479 043120  012737  001000  002052        MOV #1000,LOOP         ;GIVE ENOUGH TIME FOR TIMEOUT TO OCCUR
8480 043126  005337  002052          2$:   DEC LOOP
8481 043132  001375                        BNE 2$
8482 043134  013700  170016                MOV BECR2,R0           ;SAVE UBE ERROR REGISTER CONTENTS
8483 043140  013701  177746                MOV CCR,R1             ;SAVE CCR CONTENTS
8484 043144  005037  177776                CLR PSW                ;ALLOW INTERRUPT TO OCCUR
8485 043150  000240                        NOP
8486 043152  000401                        BR 8$
8487 043154  022626                  6$:   CMP (SP)+,(SP)+        ;TRAP TO HERE;ADJUST STACK
8488 043156  012737  000512  000510  8$:   MOV #512,510           ;RESTORE VECTORS
8489 043164  005037  000512                CLR 512                ;
8490 043170  005037  170010                CLR @#170010           ;CLEAR ERROR REGISTER
8491
     043174  000240                  25$:  NOP                    ;INSTRUCTION 'JMP 1$' PLACED HERE
     043176  000240                        NOP                    ;FOR  LOOP ON ERROR

8492 043200  012737  001015  177746        MOV #OFF,CCR           ;DISABLE CACHE
8493
8494 043206  032700  000400                BIT #400,R0            ;SLAVE SYNC ERROR BIT SHOULD BE SET
8495 043212  001003                        BNE 9$                 ;PASS
8496
```

```
                043214  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                043216  043214                          .-2
8497                                                                    ;DMA TESTS
8498                                                                    ;ATTEMPTING A DMA WRITE TO CCR REGISTER
8499                                                                    ;DID NOT RESULT IN A SSYNC TIMEOUT
8500                                                                    ;OF THE UBE
8501 043220  000000                                  0
8502 043222  032701  001000                  9$:     BIT #1000,R1                    ;CCR BIT 9 SHOULD NOT HAVE  BEEN WRITTEN TO
8503                                                                    ;BY THE UBE
8504 043226  001403                                  BEQ 10$                         ;PASS
8505
                043230  104000                          ERROR                           ;ERROR
                                                                                        ;-----
                043232  043230                          .-2
8506                                                                    ;DMA TESTS
8507                                                                    ;ATTEMPTING A DMA WRITE TO CCR
8508                                                                    ;WROTE A 1 TO CCR BIT 9
8509 043234  000000                                  0
8510 043236  000240                          10$:    NOP             ;END OF TEST
8511
8512
8513                                         .SBTTL *
8514                                         .SBTTL
8515                                         .SBTTL *           HIT REGISTER TESTS
8516                                         .SBTTL
8517                                         .SBTTL *
8518
8519
8520
8521
8522 043240  005237  001464          T223:           INC $TESTN                      ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 223
                                     .SBTTL
8523                                 .SBTTL
8524                                 .SBTTL  CHECK THAT ALL SIX HIT REGISTER BITS CAN READ 0 DUE TO SIX
8525                                 .SBTTL  READ MISSES
8526                                 .SBTTL
8527                                 ;;*****************************************************************
8528 043244  000004                          SCPCND                          ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                             ;ERROR/LOOP ON TEST
      043246  043256                          40$                             ;TEST START LOCATION
      043250  070010                          1$-40$+70000-14                 ;LOOP ON ERROR START LOCATION
      043252  000000                          0                               ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      043254  070046                          25$-40$+70000-14                ;LOOP ON ERROR END LOCATION
      043256  012737  001015  177746  40$:     MOV #OFF,CCR                    ;DISABLE CACHE
      043264  004437  002352                  JSR R4,RELCTH                   ;LOCATE TEST CODE TO HIGH CACHE SPACE
      043270  043404                          10$+2                           ;ADDRESS OF START OF NEXT TEST

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

8529 043272  012700  040000                  MOV #40000,R0                   ;ADDR. 40000 TO R0
8530 043276  012701  060000                  MOV #60000,R1                   ;ADDR 60000 TO R1
8531 043302  112737  000002  177750  1$:     MOVB #HODO,CMR                  ;HODO ALLOWS HIT REGISTER TO BE CLOCKED
```

```
8532
8533
8534 043310  012737  000015  177746          MOV #15,CCR             ;NO UCB SO AS TO WRITE CACHE STORES
8535                                                                  ;ONLY DURING THE DESTINATION ACCESS
8536 043316  005710                           TST (R0)                ;OF AN INSTRUCTION.
8537 043320  005711                           TST (R1)                ;READ MISS
8538 043322  005710                           TST (R0)                ;READ MISS
8539 043324  005711                           TST (R1)                ;READ MISS
8540 043326  005710                           TST (R0)                ;READ MISS
8541 043330  005711                           TST (R1)                ;READ MISS
8542 043332  005710                           TST (R0)                ;READ MISS
8543
8544 043334  013702  177752                  MOV CHR,R2              ;SAVE CHR CONTENTS
8545
     043340  000240                  25$:     NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
     043342  000240                           NOP                     ;FOR  LOOP ON ERROR

8546 043344  012737  001015  177746          MOV #OFF,CCR            ;DISABLE CACHE
8547 043352  105037  177750                  CLRB CMR                ;DISABLE MAINTENANCE MODE
8548
8549 043356  042702  177700                  BIC #177700,R2          ;PREPARE R2 FOR CHECK
8550 043362  005702                           TST R2                  ;CHR<5:0> SHOULD HAVE BEEN ALL 0'S
8551 043364  001406                           BEQ 10$                 ;PASS
8552
8553 043366  010237  047340                  MOV R2,CHR50            ;PREPARE FOR ERROR REPORT
8554
     043372  104000                           ERROR                           ;ERROR
                                                                              ;-----
     043374  043372                           .-2
8555                                                                  ;CHR<5:0> DID NOT INDICATE ALL 0'S
8556                                                                  ;DUE TO SIX READ MISSES
8557 043376  047340                           CHR50                   ;PRINT CHR<5:0> RECEIVED
8558 043400  000000                           0
8559
8560 043402  000240                  10$:     NOP                     ;END OF TEST
8561
8562
8563
8564
8565
8566 043404  005237  001464          T224:    INC $TESTN              ;UPDATE TEST ID
                                     ;;*****************************************************************
                                     .SBTTL
                                     .SBTTL TEST 224
                                     .SBTTL
8567                                 .SBTTL
8568                                 .SBTTL  VERIFY THAT BIT 05 OF CACHE HIT REGISTER CAN CONTAIN A 1 DUE TO
8569                                 .SBTTL  ONE READ HIT FOLLOWED BY FIVE READ MISSES
8570                                 .SBTTL
8571                                 ;;*****************************************************************
8572 043410  000004                           SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                      ;ERROR/LOOP ON TEST
     043412  043422                           40$                     ;TEST START LOCATION
     043414  070010                           1$-40$+70000-14         ;LOOP ON ERROR START LOCATION
     043416  000000                           0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
     043420  070046                           25$-40$+70000-14        ;LOOP ON ERROR END LOCATION
     043422  012737  001015  177746  40$:     MOV #OFF,CCR            ;DISABLE CACHE
```

```
        043430  004437  002352                  JSR R4,RELCTH           ;LOCATE TEST CODE TO HIGH CACHE SPACE
        043434  043552                          10$+2                   ;ADDRESS OF START OF NEXT TEST

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

 8573 043436  012700  040000                    MOV #40000,R0           ;ADDR. 40000 TO R0
 8574 043442  012701  060000                    MOV #60000,R1           ;ADDR 60000 TO R1
 8575 043446  112737  000002  177750    1$:     MOVB #HODO,CMR          ;HODO ALLOWS HIT REGISTER TO BE CLOCKED
 8576                                           ;ONLY DURING THE DESTINATION ACCESS
 8577                                           ;OF AN INSTRUCTION.
 8578 043454  012737  000015  177746            MOV #15,CCR             ;NO UCB SO AS TO WRITE CACHE STORES
 8579
 8580 043462  005710                            TST (R0)
 8581 043464  005710                            TST (R0)                ;READ HIT
 8582 043466  005711                            TST (R1)                ;READ MISS
 8583 043470  005710                            TST (R0)                ;READ MISS
 8584 043472  005711                            TST (R1)                ;READ MISS
 8585 043474  005710                            TST (R0)                ;READ MISS
 8586 043476  005711                            TST (R1)                ;READ MISS
 8587
 8588 043500  013702  177752                    MOV CHR,R2              ;SAVE CHR CONTENTS
 8589
        043504  000240                  25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
        043506  000240                          NOP                     ;FOR  LOOP ON ERROR

 8590 043510  012737  001015  177746            MOV #OFF,CCR            ;DISABLE CACHE
 8591 043516  105037  177750                    CLRB CMR                ;DISABLE MAINTENANCE MODE
 8592
 8593 043522  042702  177700                    BIC #177700,R2          ;PREPARE R2 FOR CHECK
 8594 043526  022702  000040                    CMP #40,R2              ;BIT 05 SHOULD BE 1
 8595 043532  001406                            BEQ 10$                 ;PASS
 8596
 8597 043534  010237  047340                    MOV R2,CHR50            ;PREPARE FOR ERROR REPORT
 8598
        043540  104000                          ERROR                           ;ERROR
                                                                                ;-----
        043542  043540                          .-2
 8599                                           ;CHR BIT 05 DID NOT READ 1 DUE
 8600                                           ;TO ONE READ HIT AND 5 READ MISSES
 8601 043544  047340                            CHR50                   ;PRINT CHR<5:0> RECEIVED
 8602 043546  000000                            0
 8603
 8604 043550  000240                    10$:    NOP                     ;END OF TEST
 8605
 8606
 8607
 8608
 8609                                   .SBTTL *
 8610                                   .SBTTL
 8611                                   .SBTTL *        CACHE EXERCISER TEST
 8612                                   .SBTTL
 8613                                   .SBTTL *
 8614
 8615
 8616
 8617
```

```
8618 043552  005237  001464          T225:   INC $TESTN                ;UPDATE TEST ID
                                    ;;*****************************************************************
                                    .SBTTL
                                    .SBTTL TEST 225
                                    .SBTTL
8619                                .SBTTL
8620                                .SBTTL          THIS TEST EXERCISES CACHE BY READING MEMORY LOCATIONS FROM
8621                                .SBTTL          60000 TO 77776 WITH CACHE ON. ALL 4K OF CACHE WILL HAVE BEEN
8622                                .SBTTL          EXERCISED. EACH ADDRESS FROM 60000 TO 77776 IS LOADED WITH
8623                                .SBTTL          DATA CORRESPONDING TO ITS OWN ADDRESS.
8624                                .SBTTL
8625                                ;;*****************************************************************
8626 043556  000004                       SCPCND                      ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                       ;ERROR/LOOP ON TEST
      043560  043570                       40$                         ;TEST START LOCATION
      043562  043570                       1$                          ;LOOP ON ERROR START LOCATION
      043564  000000                       0                           ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      043566  043700                       25$                         ;LOOP ON ERROR END LOCATION
      043570                        40$:
8627
8628 043570  012700  060000          1$:   MOV #60000,R0               ;FIRST ADDRESS
8629 043574  010010                2$:   MOV R0,(R0)                 ;FILL MEMORY WITH ADDRESSES
8630 043576  005720                      TST (R0)+                   ;
8631 043600  020027  077776              CMP R0,#77776
8632 043604  101773                      BLOS 2$
8633 043606  012700  060000              MOV #60000,R0               ;FIRST ADDRESS
8634 043612  005037  177746              CLR @#177746                ;ENABLE CACHE
8635 043616  005110                3$:   COM (R0)                    ;DOUBLE COMPLEMENT DATA AND
8636 043620  005110                      COM (R0)                    ;MAKE SURE IT IS IN THE CACHE
8637 043622  011005                      MOV (R0),R5                 ;CREATE READ HIT;STORE CACHED DATA
8638                                                                  ;IN R5
8639 043624  020500                      CMP R5,R0                   ;CHECK RESULTS
8640 043626  001420                      BEQ 5$                      ;PASS
8641 043630  012737  001015  177746      MOV #OFF,CCR                ;DISABLE CACHE
8642 043636  010037  047344              MOV R0,FAILAD               ;SAVE FAILED ADDRESS
8643 043642  010037  047320              MOV R0,EXDAT6               ;GET EXPECTED DATA
8644 043646  010537  047334              MOV R5,RECDAT               ;GET RECEIVED DATA
8645
      043652  104000                      ERROR                               ;ERROR
                                                                            ;-----
      043654  043652                      .-2
8646 043656  047344                      FAILAD                      ;PRINT FAILED ADDRESS
8647 043660  047320                      EXDAT6                      ;PRINT EXPECTED DATA
8648 043662  047334                      RECDAT                      ;PRINT RECEIVED DATA
8649 043664  000000                      0
8650 043666  000404                      BR 25$                      ;
8651 043670  005720                5$:   TST (R0)+                   ;NEXT ADDRESS
8652 043672  020027  077776              CMP R0,#77776               ;FINISHED?
8653 043676  101747                      BLOS 3$                     ;CONTINUE
8654
      043700  000240                25$:  NOP                         ;INSTRUCTION 'JMP 1$' PLACED HERE
      043702  000240                      NOP                         ;FOR  LOOP ON ERROR

8655 043704  000240                10$:  NOP                         ;END OF TEST
8656
8657
8658 043706  005237  001464          T226:   INC $TESTN                ;UPDATE TEST ID
```

```
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 226
                                .SBTTL
                                ;;*****************************************************************
                                .SBTTL  TEST DESCRIPTION:
                                .SBTTL  VERIFY THAT THE ASRB INSTRUCTION WILL CAUSE A CACHE BYPASS
                                .SBTTL  UNDER A READ HIT CONDITION.
                                .SBTTL
                                ;;*****************************************************************
043712  000004                          SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
043714  043724                          40$                     ;TEST START LOCATION
043716  043724                          1$                      ;LOOP ON ERROR START LOCATION
043720  000000                          0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
043722  043754                          25$                     ;LOOP ON ERROR END LOCATION
043724                          40$:
043724  012700  060000          1$:     MOV #60000,R0           ;SETUP TEST LOCATION ADDRESS
                                                                ;IN R0
043730  112737  000002  177750          MOVB #2,@#177750        ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AN
                                                                ;CLOCKING OF OUTPUT OF CACHE HIT NAND
                                                                ;GATE INTO CMR ONLY DURING THE DESTINATION
                                                                ;ACCESS OF AN INSTRUCTION.
043736  012737  000011  177746          MOV #11,@#177746        ;NO UCB SO AS TO WRITE CACHE STORES
                                                                ;ENABLE LOW CACHE FOR A READ HIT
043744  005710                          TST (R0)                ;READING LOCATION SPECIFIED BY R0
                                                                ;WILL ASSURE A READ HIT WHEN THE
                                                                ;LOCATION IS READ AGAIN
043746  106210                          ASRB (R0)               ;ASRB INSTRUCTION WILL CAUSE A BYPASS
                                                                ;TO OCCUR INHIBITING A READ HIT
                                                                ;TO LOCATION SPECIFIED BY R0.
                                                                ;THIS SITUATION WILL RESULT IN CMR
                                                                ;BIT 8 BEING A 1.
043750  013701  177750                  MOV @#177750,R1         ;SAVE CMR CONTENTS
043754  000240          25$:    NOP                             ;INSTRUCTION 'JMP 1$' PLACED HERE
043756  000240                  NOP                             ;FOR  LOOP ON ERROR
043760  105037  177750                  CLRB @#177750           ;DISABLE MAINT MODE
043764  012737  000000  177746          MOV #0,@#177746         ;TURN ON CACHE
043772  032701  000400                  BIT #400,R1             ;WAS CMR BIT 8 A 1
044000  001003                          BNE 10$                 ;PASS
044000  104000                          ERROR                           ;ERROR
                                                                        ;-----
044002  044000                          .-2
                                                                ;CACHE BYPASS DID NOT OCCUR OR
                                                                ;SEQUENCE ERROR
                                                                ;READING OUTPUT OF CACHE HIT NAND GATE
                                                                ;THRU CMR<8> DID NOT RESULT IN A 1
044004  000000                          0
044006  000240          10$:    NOP             ;END OF TEST
044010  005237  001464  T227:           INC $TESTN              ;UPDATE TEST ID
```

```
                                ;;*****************************************************************
                                .SBTTL
                                .SBTTL TEST 227
                                .SBTTL
 8700 044014  000004                    SCPCND                  ;SCOPE CONDITIONS:GO SET UP FOR LOOP ON
                                                                ;ERROR/LOOP ON TEST
      044016  044026                    40$                     ;TEST START LOCATION
      044020  044026                    1$                      ;LOOP ON ERROR START LOCATION
      044022  000000                    0                       ;SCOPE SYNC. NOT IMPLEMENTED FOR  THIS TEST
      044024  044030                    25$                     ;LOOP ON ERROR END LOCATION
      044026                    40$:
 8701 044026  000240            1$:     NOP
 8702
      044030  000240            25$:    NOP                     ;INSTRUCTION 'JMP 1$' PLACED HERE
      044032  000240                    NOP                     ;FOR  LOOP ON ERROR

 8703
 8704
 8705
 8706
 8707
 8708                           ;;*****************************************************************
 8709 044034  005737  001466    ENDPAS:         TST $PASS               ;IS THIS FIRST PASS?
 8710 044040  001412                            BEQ 1$                  ;YES; INHIBIT ITERATIONS
 8711 044042  032777  004000  136014            BIT #BIT11,@SWR         ;IS INHIBIT ITERATIONS IMPLEMENTED
 8712                                           ;THRU SWITCH REGISTER?
 8713 044050  001006                            BNE 1$                  ;YES
 8714 044052  005237  044172                    INC $ICNT               ;INCREMENT PASS ITERATION COUNTER
 8715 044056  023737  044170  044172            CMP $TIMES,$ICNT        ;HAVE ALL ITERATIONS BEEN COMPLETED?
 8716 044064  001037                            BNE $DOAGN              ;NO,REPEAT PROGRAM
 8717 044066  005037  044172            1$:     CLR $ICNT               ;CLEAR PASS ITERATION COUNTER
 8718 044072  005237  001466                    INC $PASS               ;INCREMENT PASS COUNT
 8719 044076  042737  100000  001466            BIC #100000,$PASS       ;DON'T ALLW A NEGATIVE #
 8720 044104  104401  044112            TYPE    ,65$            ;;TYPE ASCIZ STRING
      044110  000410                    BR      64$             ;;GET OVER THE ASCIZ
                                ;;65$:  .ASCIZ  <CRLF>/END OF PASS # /
      044132                    64$:
 8721 044132  013746  001466            MOV     $PASS,-(SP)     ;;SAVE $PASS FOR TYPEOUT
      044136  104405                    TYPDS                   ;;GO TYPE--DECIMAL ASCII WITH SIGN
 8722 044140  104401  002112                    TYPE ,$ENULL
 8723 044144  013700  000042                    MOV @#42,R0
 8724 044150  001405                            BEQ $DOAGN
 8725 044152  000005                            RESET
 8726 044154  004710            $ENDAD:         JSR PC,(R0)
 8727 044156  000240                            NOP
 8728 044160  000240                            NOP
 8729 044162  000240                            NOP
 8730 044164  000137  002400    $DOAGN:         JMP BEGIN               ;START AGAIN
 8731
 8732 044170  000012            $TIMES: .WORD   10.
 8733 044172  000000            $ICNT:  .WORD   0
 8734
 8735
```

```
8737
8738                                    ;               SYSMAC ROUTINES
8739
8740                                    .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
                                        ;*

044174  105737  002101          $TYPE:  TSTB    $TPFLG          ;;IS THERE A TERMINAL?
044200  100002                          BPL     1$              ;;BR IF YES
044202  000000                          HALT                    ;;HALT HERE IF NO TERMINAL
044204  000430                          BR      3$              ;;LEAVE
044206  010046                  1$:     MOV     R0,-(SP)        ;;SAVE R0
044210  017600  000002                  MOV     @2(SP),R0       ;;GET ADDRESS OF ASCIZ STRING
044214  122737  000001  001500          CMPB    #APTENV,$ENV    ;;RUNNING IN APT MODE
044222  001011                          BNE     62$             ;;NO,GO CHECK FOR APT CONSOLE
044224  132737  000100  001501          BITB    #APTSPOOL,$ENVM ;;SPOOL MESSAGE TO APT
044232  001405                          BEQ     62$             ;;NO,GO CHECK FOR CONSOLE
044234  010037  044244                  MOV     R0,61$          ;;SETUP MESSAGE ADDRESS FOR APT
044240  004737  001612                  JSR     PC,$ATY3        ;;SPOOL MESSAGE TO APT
044244  000000                  61$:    .WORD   0               ;;MESSAGE ADDRESS
044246  132737  000040  001501  62$:    BITB    #APTCSUP,$ENVM  ;;APT CONSOLE SUPPRESSED
044254  001003                          BNE     60$             ;;YES,SKIP TYPE OUT
044256  112046                  2$:     MOVB    (R0)+,-(SP)     ;;PUSH CHARACTER TO BE TYPED ONTO STACK
044260  001005                          BNE     4$              ;;BR IF IT ISN'T THE TERMINATOR
044262  005726                          TST     (SP)+           ;;IF TERMINATOR POP IT OFF THE STACK
044264  012600                  60$:    MOV     (SP)+,R0        ;;RESTORE R0
044266  062716  000002          3$:     ADD     #2,(SP)         ;;ADJUST RETURN PC
044272  000002                          RTI                     ;;RETURN
044274  122716  000011          4$:     CMPB    #HT,(SP)        ;;BRANCH IF <HT>
044300  001430                          BEQ     8$
044302  122716  000200                  CMPB    #CRLF,(SP)      ;;BRANCH IF NOT <CRLF>
044306  001006                          BNE     5$
044310  005726                          TST     (SP)+           ;;POP  <CR><LF> EQUIV
044312  104401                          TYPE                    ;;TYPE A CR AND LF
044314  002107                          $CRLF
044316  105037  044522                  CLRB    $CHARCNT        ;;CLEAR CHARACTER COUNT
044322  000755                          BR      2$              ;;GET NEXT CHARACTER
044324  004737  044406          5$:     JSR     PC,$TYPEC       ;;GO TYPE THIS CHARACTER
044330  123726  002100          6$:     CMPB    $FILLC,(SP)+    ;;IS IT TIME FOR FILLER CHARS.?
044334  001350                          BNE     2$              ;;IF NO GO GET NEXT CHAR.
044336  013746  002076                  MOV     $NULL,-(SP)     ;;GET # OF FILLER CHARS. NEEDED
                                                                ;;AND THE NULL CHAR.
044342  105366  000001          7$:     DECB    1(SP)           ;;DOES A NULL NEED TO BE TYPED?
044346  002770                          BLT     6$              ;;BR IF NO--GO POP THE NULL OFF OF STACK
```

```
044350  004737  044406                  JSR     PC,$TYPEC       ;;GO TYPE A NULL
044354  105337  044522                  DECB    $CHARCNT        ;;DO NOT COUNT AS A COUNT
044360  000770                          BR      7$              ;;LOOP

                                ;HORIZONTAL TAB PROCESSOR

044362  112716  000040          8$:     MOVB    #' ,(SP)        ;;REPLACE TAB WITH SPACE
044366  004737  044406          9$:     JSR     PC,$TYPEC       ;;TYPE A SPACE
044372  132737  000007  044522          BITB    #7,$CHARCNT     ;;BRANCH IF NOT AT
044400  001372                          BNE     9$              ;;TAB STOP
044402  005726                          TST     (SP)+           ;;POP SPACE OFF STACK
044404  000724                          BR      2$              ;;GET NEXT CHARACTER
044406  105777  135460          $TYPEC: TSTB    @$TPS           ;;WAIT UNTIL PRINTER IS READY
044412  100375                          BPL     $TYPEC
044414  116677  000002  135452          MOVB    2(SP),@$TPB     ;;LOAD CHAR TO BE TYPED INTO DATA REG.
044422  105777  135440                  TSTB    @$TKS           ;;SEE IF KEYBOARD IS TALKING.
044426  100021                          BPL     2$              ;;BRANCH IF IT ISN'T.
044430  017746  135434                  MOV     @$TKB,-(SP)     ;;PUSH CHARACTER ONTO STACK.
044434  042716  177600                  BIC     #177600,(SP)    ;;BIT CLEAR TOP BYTE AND PARITY BIT.
044440  022726  000023                  CMP     #23,(SP)+       ;;SEE IF THIS IS A ^S.
044444  001012                          BNE     2$              ;;BRANCH TO CONTINUE IF IT ISN'T.
044446  105777  135414          3$:     TSTB    @$TKS           ;;WAIT FOR ANOTHER INPUT.
044452  100375                          BPL     3$              ;;BRANCH BACK IF NOT READY.
044454  017746  135410                  MOV     @$TKB,-(SP)     ;;PUSH NEXT CHARACTER ON STACK.
044460  042716  177600                  BIC     #177600,(SP)    ;;BIT CLEAR TOP BYTE AND PARITY BIT.
044464  022726  000021                  CMP     #21,(SP)+       ;;SEE IF THIS IS A ^Q.
044470  001366                          BNE     3$              ;;BRANCH BACK FOR MORE WAIT IF NOT.
044472  122766  000015  000002  2$:     CMPB    #CR,2(SP)       ;;IS CHARACTER A CARRIAGE RETURN?
044500  001003                          BNE     1$              ;;BRANCH IF NO
044502  105037  044522                  CLRB    $CHARCNT        ;;YES--CLEAR CHARACTER COUNT
044506  000406                          BR      $TYPEX          ;;EXIT
044510  122766  000012  000002  1$:     CMPB    #LF,2(SP)       ;;IS CHARACTER A LINE FEED?
044516  001402                          BEQ     $TYPEX          ;;BRANCH IF YES
044520  105227                          INCB    (PC)+           ;;COUNT THE CHARACTER
044522  000000          $CHARCNT:.WORD  0                       ;;CHARACTER COUNT STORAGE
044524  000207          $TYPEX: RTS     PC

8741                            .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

044526  017646  000000        $TYPOS: MOV     @(SP),-(SP)     ;;PICKUP THE MODE
044532  116637  000001 044751         MOVB    1(SP),$OFILL    ;;LOAD ZERO FILL SWITCH
044540  112637  044753                MOVB    (SP)+,$OMODE+1  ;;NUMBER OF DIGITS TO TYPE
044544  062716  000002                ADD     #2,(SP)         ;;ADJUST RETURN ADDRESS
044550  000406                        BR      $TYPON
044552  112737  000001 044751 $TYPOC: MOVB    #1,$OFILL       ;;SET THE ZERO FILL SWITCH
044560  112737  000006 044753         MOVB    #6,$OMODE+1     ;;SET FOR SIX(6) DIGITS
044566  112737  000005 044750 $TYPON: MOVB    #5,$OCNT        ;;SET THE ITERATION COUNT
044574  010346                        MOV     R3,-(SP)        ;;SAVE R3
044576  010446                        MOV     R4,-(SP)        ;;SAVE R4
044600  010546                        MOV     R5,-(SP)        ;;SAVE R5
044602  113704  044753                MOVB    $OMODE+1,R4     ;;GET THE NUMBER OF DIGITS TO TYPE
044606  005404                        NEG     R4
044610  062704  000006                ADD     #6,R4           ;;SUBTRACT IT FOR MAX. ALLOWED
044614  110437  044752                MOVB    R4,$OMODE       ;;SAVE IT FOR USE
044620  113704  044751                MOVB    $OFILL,R4       ;;GET THE ZERO FILL SWITCH
044624  016605  000012                MOV     12(SP),R5       ;;PICKUP THE INPUT NUMBER
044630  005003                        CLR     R3              ;;CLEAR THE OUTPUT WORD
044632  006105                1$:     ROL     R5              ;;ROTATE MSB INTO "C"
044634  000404                        BR      3$              ;;GO DO MSB
044636  006105                2$:     ROL     R5              ;;FORM THIS DIGIT
044640  006105                        ROL     R5
044642  006105                        ROL     R5
044644  010503                        MOV     R5,R3
044646  006103                3$:     ROL     R3              ;;GET LSB OF THIS DIGIT
044650  105337  044752                DECB    $OMODE          ;;TYPE THIS DIGIT?
044654  100016                        BPL     7$              ;;BR IF NO
044656  042703  177770                BIC     #177770,R3      ;;GET RID OF JUNK
044662  001002                        BNE     4$              ;;TEST FOR 0
044664  005704                        TST     R4              ;;SUPPRESS THIS 0?
044666  001403                        BEQ     5$              ;;BR IF YES
044670  005204                4$:     INC     R4              ;;DON'T SUPPRESS ANYMORE 0'S
044672  052703  000060                BIS     #'0,R3          ;;MAKE THIS DIGIT ASCII
044676  052703  000040        5$:     BIS     #' ,R3          ;;MAKE ASCII IF NOT ALREADY
044702  110337  044746                MOVB    R3,8$           ;;SAVE FOR TYPING
044706  104401  044746                TYPE    ,8$             ;;GO TYPE THIS DIGIT
044712  105337  044750        7$:     DECB    $OCNT           ;;COUNT BY 1
044716  003347                        BGT     2$              ;;BR IF MORE TO DO
044720  002402                        BLT     6$              ;;BR IF DONE
044722  005204                        INC     R4              ;;INSURE LAST DIGIT ISN'T A BLANK
044724  000744                        BR      2$              ;;GO DO THE LAST DIGIT
044726  012605                6$:     MOV     (SP)+,R5        ;;RESTORE R5
044730  012604                        MOV     (SP)+,R4        ;;RESTORE R4
044732  012603                        MOV     (SP)+,R3        ;;RESTORE R3
044734  016666  000002 000004        MOV     2(SP),4(SP)     ;;SET THE STACK FOR RETURNING
044742  012616                        MOV     (SP)+,(SP)
044744  000002                        RTI                     ;;RETURN
044746     000                8$:     .BYTE   0               ;;STORAGE FOR ASCII DIGIT
044747     000                        .BYTE   0               ;;TERMINATOR FOR TYPE ROUTINE
044750     000                $OCNT:  .BYTE   0               ;;OCTAL DIGIT COUNTER
044751     000                $OFILL: .BYTE   0               ;;ZERO FILL SWITCH
044752  000000                $OMODE: .WORD   0               ;;NUMBER OF DIGITS TO TYPE
```

```
8742                                    .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

044754                                  $TYPDS:
044754  010046                                 MOV     R0,-(SP)        ;;PUSH R0 ON STACK
044756  010146                                 MOV     R1,-(SP)        ;;PUSH R1 ON STACK
044760  010246                                 MOV     R2,-(SP)        ;;PUSH R2 ON STACK
044762  010346                                 MOV     R3,-(SP)        ;;PUSH R3 ON STACK
044764  010546                                 MOV     R5,-(SP)        ;;PUSH R5 ON STACK
044766  012746  020200                        MOV     #20200,-(SP)    ;;SET BLANK SWITCH AND SIGN
044772  016605  000020                        MOV     20(SP),R5       ;;GET THE INPUT NUMBER
044776  100004                                BPL     1$              ;;BR IF INPUT IS POS.
045000  005405                                NEG     R5              ;;MAKE THE BINARY NUMBER POS.
045002  112766  000055  000001                MOVB    #'-,1(SP)       ;;MAKE THE ASCII NUMBER NEG.
045010  005000                        1$:     CLR     R0              ;;ZERO THE CONSTANTS INDEX
045012  012703  045170                        MOV     #$DBLK,R3       ;;SETUP THE OUTPUT POINTER
045016  112723  000040                        MOVB    #' ,(R3)+       ;;SET THE FIRST CHARACTER TO A BLANK
045022  005002                        2$:     CLR     R2              ;;CLEAR THE BCD NUMBER
045024  016001  045160                        MOV     $DTBL(R0),R1    ;;GET THE CONSTANT
045030  160105                        3$:     SUB     R1,R5           ;;FORM THIS BCD DIGIT
045032  002402                                BLT     4$              ;;BR IF DONE
045034  005202                                INC     R2              ;;INCREASE THE BCD DIGIT BY 1
045036  000774                                BR      3$
045040  060105                        4$:     ADD     R1,R5           ;;ADD BACK THE CONSTANT
045042  005702                                TST     R2              ;;CHECK IF BCD DIGIT=0
045044  001002                                BNE     5$              ;;FALL THROUGH IF 0
045046  105716                                TSTB    (SP)            ;;STILL DOING LEADING 0'S?
045050  100407                                BMI     7$              ;;BR IF YES
045052  106316                        5$:     ASLB    (SP)            ;;MSD?
045054  103003                                BCC     6$              ;;BR IF NO
045056  116663  000001  177777                MOVB    1(SP),-1(R3)    ;;YES--SET THE SIGN
045064  052702  000060                6$:     BIS     #'0,R2          ;;MAKE THE BCD DIGIT ASCII
045070  052702  000040                7$:     BIS     #' ,R2          ;;MAKE IT A SPACE IF NOT ALREADY A DIGIT
045074  110223                                MOVB    R2,(R3)+        ;;PUT THIS CHARACTER IN THE OUTPUT BUFFER
045076  005720                                TST     (R0)+           ;;JUST INCREMENTING
045100  020027  000010                        CMP     R0,#10          ;;CHECK THE TABLE INDEX
045104  002746                                BLT     2$              ;;GO DO THE NEXT DIGIT
045106  003002                                BGT     8$              ;;GO TO EXIT
045110  010502                                MOV     R5,R2           ;;GET THE LSD
045112  000764                                BR      6$              ;;GO CHANGE TO ASCII
045114  105726                        8$:     TSTB    (SP)+           ;;WAS THE LSD THE FIRST NON-ZERO?
045116  100003                                BPL     9$              ;;BR IF NO
045120  116663  177777  177776                MOVB    -1(SP),-2(R3)   ;;YES--SET THE SIGN FOR TYPING
045126  105013                        9$:     CLRB    (R3)            ;;SET THE TERMINATOR
045130  012605                                MOV     (SP)+,R5        ;;POP STACK INTO R5
045132  012603                                MOV     (SP)+,R3        ;;POP STACK INTO R3
045134  012602                                MOV     (SP)+,R2        ;;POP STACK INTO R2
045136  012601                                MOV     (SP)+,R1        ;;POP STACK INTO R1
```

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                                                                    H 2
045140  012600                          MOV     (SP)+,R0        ;;POP STACK INTO R0
045142  104401  045170                  TYPE    ,$DBLK          ;;NOW TYPE THE NUMBER
045146  016666  000002  000004          MOV     2(SP),4(SP)     ;;ADJUST THE STACK
045154  012616                          MOV     (SP)+,(SP)
045156  000002                          RTI                     ;;RETURN TO USER
045160  023420                  $DTBL:  10000.
045162  001750                          1000.
045164  000144                          100.
045166  000012                          10.
045170                          $DBLK:  .BLKW   4
8743                            .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.

045200  010046                  $TRAP:  MOV     R0,-(SP)        ;;SAVE R0
045202  016600  000002                  MOV     2(SP),R0        ;;GET TRAP ADDRESS
045206  005740                          TST     -(R0)           ;;BACKUP BY 2
045210  111000                          MOVB    (R0),R0         ;;GET RIGHT BYTE OF TRAP
045212  006300                          ASL     R0              ;;POSITION FOR INDEXING
045214  016000  045234                  MOV     $TRPAD(R0),R0   ;;INDEX TO TABLE
045220  000200                          RTS     R0              ;;GO TO ROUTINE


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

045222  011646                  $TRAP2: MOV     (SP),-(SP)      ;;MOVE THE PC DOWN
045224  016666  000004  000002          MOV     4(SP),2(SP)     ;;MOVE THE PSW DOWN
045232  000002                          RTI                     ;;RESTORE THE PSW

                                .SBTTL  TRAP TABLE

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

                                ;       ROUTINE
                                ;       -------
045234  045222                  $TRPAD: .WORD   $TRAP2
045236  044174                          $TYPE   ;;CALL=TYPE     TRAP+1(104401)  TTY TYPEOUT ROUTINE
045240  044552                          $TYPOC  ;;CALL=TYPOC    TRAP+2(104402)  TYPE OCTAL NUMBER (WITH LEADING ZEROS)
045242  044526                          $TYPOS  ;;CALL=TYPOS    TRAP+3(104403)  TYPE OCTAL NUMBER (NO LEADING ZEROS)
045244  044566                          $TYPON  ;;CALL=TYPON    TRAP+4(104404)  TYPE OCTAL NUMBER (AS PER LAST CALL)
045246  044754                          $TYPDS  ;;CALL=TYPDS    TRAP+5(104405)  TYPE DECIMAL NUMBER (WITH SIGN)


8744
8745                            ;;**********************************************************************
8746
8747            104000                  ERROR=104000
8748 045250    000000                  ERRPC:  .WORD   0
8749
8750 045252    010037  045304  $ERROR:         MOV R0,SAVR0            ;SAVE R0 THRU R5
8751 045256    010137  045306                  MOV R1,SAVR1
8752 045262    010237  045310                  MOV R2,SAVR2
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 8753 045266  010337  045312                        MOV R3,SAVR3
 8754 045272  010437  045314                        MOV R4,SAVR4
 8755 045276  010537  045316                        MOV R5,SAVR5
 8756 045302  000406                                BR TITL
 8757 045304  000000                        SAVR0:  .WORD
 8758 045306  000000                        SAVR1:  .WORD
 8759 045310  000000                        SAVR2:  .WORD
 8760 045312  000000                        SAVR3:  .WORD
 8761 045314  000000                        SAVR4:  .WORD
 8762 045316  000000                        SAVR5:  .WORD
 8763
 8764
 8765 045320  032777  020000  134536  TITL:         BIT #BIT13,@SWR          ;INHIBIT ERROR TYPEOUTS?
 8766 045326  001113                                BNE INHERR               ;YES
 8767
 8768 045330  011601                                MOV (SP),R1              ;R1 CONTAINS ADDRESS FOLLOWING ERRPC ADDRESS
 8769 045332  012137  045250                        MOV (R1)+,ERRPC          ;LOAD ERRPC ADDRESS AND POINT
 8770                                                                         ;TO NEXT ARGUEMENT
 8771 045336  104401  045344                TYPE    ,65$                ;;TYPE ASCIZ STRING
      045342  000411                        BR      64$                 ;;GET OVER THE ASCIZ
                                     ;;65$:  .ASCIZ  <CRLF><CRLF>/TESTNO    ERRPC/
      045366                         64$:
 8772
 8773 045366  005711                        3$:     TST (R1)                 ;END OF ARGUEMENTS?
 8774 045370  001412                                BEQ DAT                  ;YES,GO PRINT DATA
 8775 045372  012702  047236                        MOV #PRTABL,R2           ;ADDRESS OF START OF PRINT TABLE LIST
 8776 045376  012703  045742                        MOV #PRTITL,R3           ;ADDRESS OF START OF TITLES
 8777 045402  005723                        2$:     TST (R3)+                ;INDEX THRU TITLES
 8778 045404  021122                                CMP (R1),(R2)+           ;SEARCH PRINT TABLE LIST FOR TITLE
 8779 045406  001375                                BNE 2$                   ;NO; CHECK NEXT LOCATION IN LIST
 8780
 8781 045410  004753                                JSR PC,@-(R3)            ;FOUND IT; GO PRINT TITLE
 8782 045412  005721                                TST (R1)+                ;R1 POINTS TO NXT ARGUEMENT IN TEST CODE
 8783 045414  000764                                BR 3$
 8784
 8785
 8786 045416                        DAT:
      045416  104401  045424                TYPE    ,65$                ;;TYPE ASCIZ STRING
      045422  000401                        BR      64$                 ;;GET OVER THE ASCIZ
                                     ;;65$:  .ASCIZ  <CRLF>
      045426                         64$:
 8787 045426  013746  001464                MOV     $TESTN,-(SP)        ;;SAVE $TESTN FOR TYPEOUT
      045432  104403                        TYPOS                       ;;GO TYPE--OCTAL ASCII
      045434     006                        .BYTE   6                   ;;TYPE 6 DIGIT(S)
      045435     000                        .BYTE   0                   ;;SUPPRESS LEADING ZEROS
 8788 045436  104401  045444                TYPE    ,67$                ;;TYPE ASCIZ STRING
      045442  000402                        BR      66$                 ;;GET OVER THE ASCIZ
                                     ;;67$:  .ASCIZ  /  /
      045450                         66$:
 8789 045450  013746  045250                MOV     ERRPC,-(SP)         ;;SAVE ERRPC FOR TYPEOUT
      045454  104402                        TYPOC                       ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
 8790 045456  104401  002112                TYPE ,$ENULL
 8791
 8792 045462  011601                                MOV (SP),R1              ;R1 CONTAINS ADDRESS FOLLOWING ERRORPC ADDRESS
 8793 045464  005721                                TST (R1)+                ;POINT TO NEXT ARGUEMENT
 8794 045466  005711                        3$:     TST (R1)                 ;END OF ARGUEMENTS?
 8795 045470  001437                                BEQ FIN                  ;YES
```

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8796 045472  012702  047236                      MOV #PRTABL,R2          ;ADDRESS OF START OF PRINT TABLE LIST
8797 045476  012703  046714                      MOV #PRDATA,R3          ;ADDRESS OF STERT OF PRINT DATA
8798 045502  005723                      2$:     TST (R3)+               ;INDEX THRU DATA PRINTS
8799 045504  021122                              CMP (R1),(R2)+          ;SEARCH PRINT TABLE LIST FOR TITLE
8800 045506  001375                              BNE 2$                  ;NO; CHECK NEXT LOCATION IN LIST
8801 045510  104401  045516                      TYPE    ,69$            ;;TYPE ASCIZ STRING
     045514  000404                              BR      68$             ;;GET OVER THE ASCIZ
                                       ;;69$:   .ASCIZ  /      /
     045526                            68$:
8802 045526  004753                              JSR PC,@-(R3)           ;
8803 045530  104401  002112                      TYPE ,$ENULL
8804 045534  104401  045542                      TYPE    ,71$            ;;TYPE ASCIZ STRING
     045540  000404                              BR      70$             ;;GET OVER THE ASCIZ
                                       ;;71$:   .ASCIZ  /      /
     045552                            70$:
8805 045552  005721                              TST (R1)+               ;R1 POINTS TO NEXT ARGUEMENT
8806 045554  000744                              BR 3$
8807
8808                                     ;INHIBIT ERROR TYPEOUT CODE
8809
8810 045556  011601                      INHERR: MOV (SP),R1             ;R1 CONTAINS ADDRESS FOLLOWING
8811                                              ;ERRPC ADDRESS
8812 045560  005711                      1$:     TST (R1)                ;IS THIS THE END OF ARGUEMENT LIST?
8813 045562  001402                              BEQ FIN                 ;YES
8814 045564  005721                              TST (R1)+               ;POINT TO NEXT ARGUEMENT
8815 045566  000774                              BR 1$
8816
8817
8818 045570  005721                      FIN:    TST (R1)+               ;R1 NOW CONTAINS RETURN ADDRESS
8819 045572  010116                              MOV R1,(SP)             ;SETUP RETURN ADDRESS IN STACK
8820
8821                                     ;HOE,LOE OPTION DETERMINATION
8822
8823 045574  122737  000001  001500              CMPB #APTENV,$ENV       ;IS THIS APT?
8824 045602  001410                              BEQ 2$                  ;YES HALT ON ERROR
8825 045604  023737  000042  000046              CMP @#42,@#46           ;IS THIS ACT11 QV OR AUTO ACCEPT
8826 045612  001404                              BEQ 2$                  ;YES HALT ON ERROR
8827 045614  032777  100000  134242              BIT #BIT15,@SWR         ;IS HALT ON ERROR IMPLEMENTED?
8828 045622  001401                              BEQ 1$                  ;NO
8829 045624  000000                      2$:     HALT                    ;YES ,HALT PROCESSOR
8830 045626  032777  001000  134230      1$:     BIT #BIT09,@SWR         ;IS LOOP ON ERROR IMPLEMENTED?
8831 045634  001010                              BNE 4$                  ;YES
8832                                                                    ;NO;INITIALIZE LOCATIONS WHERE
8833                                                                    ;'JMP 1$' IS PLACED FOR LOOP ON ERROR
8834                                                                    ;WITH NOP'S
8835 045636  012777  000240  134260              MOV #240,@ADRJMP
8836 045644  012777  000240  134254              MOV #240,@ADR1$
8837 045652  000137  045710                      JMP 5$                  ;CONTINUE WITH PRESENT TEST
8838
8839 045656  012777  000137  134240      4$:     MOV #137,@ADRJMP                ;WRITE 'JMP' INSTRUCTION TO PROPER ADDRESS
8840 045664  013777  002120  134234              MOV @#STRTLP,@ADR1$     ;WRITE '1$' LOCATION TO PROPER ADDRESS
8841 045672  013737  002??2  177752              MOV ADRSYNC,CHR         ;LOAD ADDRESS LOCATION FOR SCOPE SYNC
8842 045700  105037  177751                      CLRB CMR+1
8843 045704  013716  002120                      MOV @#STRTLP,(SP)       ;SETUP LOCATION FOR LOOP ON ERROR
8844                                                                    ;IN STACK
8845
8846
```

```
 8847 045710  013700  045304                    5$:     MOV SAVR0,R0            ;RESTORE REGISTERS
 8848 045714  013701  045306                            MOV SAVR1,R1
 8849 045720  013702  045310                            MOV SAVR2,R2
 8850 045724  013703  045312                            MOV SAVR3,R3
 8851 045730  013704  045314                            MOV SAVR4,R4
 8852 045734  013705  045316                            MOV SAVR5,R5
 8853
 8854 045740  000002                                    RTI                     ;RETURN
 8855 045742  046004                       PRTITL: 1$
 8856 045744  046040                               2$
 8857 045746  046074                               3$
 8858 045750  046130                               4$
 8859 045752  046164                               5$
 8860 045754  046220                               6$
 8861 045756  046254                               7$
 8862 045760  046310                               8$
 8863 045762  046344                               9$
 8864 045764  046400                               10$
 8865 045766  046434                               11$
 8866 045770  046470                               12$
 8867 045772  046524                               13$
 8868 045774  046550                               14$
 8869 045776  046602                               15$
 8870 046000  046630                               16$
 8871 046002  046662                               17$
 8872 046004                                       1$:
      046004  104401  046012                       TYPE    ,65$            ;;TYPE ASCIZ STRING
      046010  000412                               BR      64$             ;;GET OVER THE ASCIZ
                                           ;;65$:  .ASCIZ  /    CA210(21:0)    /
      046036                               64$:
 8873 046036  000207                               RTS PC
 8874 046040                                       2$:
      046040  104401  046046                       TYPE    ,67$            ;;TYPE ASCIZ STRING
      046044  000412                               BR      66$             ;;GET OVER THE ASCIZ
                                           ;;67$:  .ASCIZ  /    AMR210(21:0)   /
      046072                               66$:
 8875 046072  000207                               RTS PC
 8876 046074                                       3$:
      046074  104401  046102                       TYPE    ,69$            ;;TYPE ASCIZ STRING
      046100  000412                               BR      68$             ;;GET OVER THE ASCIZ
                                           ;;69$:  .ASCIZ  /   CHR157(15:07)   /
      046126                               68$:
 8877 046126  000207                               RTS PC
 8878 046130                                       4$:
      046130  104401  046136                       TYPE    ,71$            ;;TYPE ASCIZ STRING
      046134  000412                               BR      70$             ;;GET OVER THE ASCIZ
                                           ;;71$:  .ASCIZ  /   CA2113(21:13)   /
      046162                               70$:
 8879 046162  000207                               RTS PC
 8880 046164                                       5$:
      046164  104401  046172                       TYPE    ,73$            ;;TYPE ASCIZ STRING
      046170  000412                               BR      72$             ;;GET OVER THE ASCIZ
                                           ;;73$:  .ASCIZ  /     CHR80(8:0)    /
      046216                               72$:
 8881 046216  000207                               RTS PC
 8882 046220                                       6$:
      046220  104401  046226                       TYPE    ,75$            ;;TYPE ASCIZ STRING
```

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        046224  000412                          BR      74$             ;;GET OVER THE ASCIZ
                                        ;;75$:  .ASCIZ  /   CDR150(15:0)   /
        046252                          74$:
 8883   046252  000207                          RTS PC
 8884   046254                          7$:
        046254  104401  046262                  TYPE    ,77$            ;;TYPE ASCIZ STRING
        046260  000412                          BR      76$             ;;GET OVER THE ASCIZ
                                        ;;77$:  .ASCIZ  /      EXDAT6      /
        046306                          76$:
 8885   046306  000207                          RTS PC
 8886   046310                          8$:
        046310  104401  046316                  TYPE    ,79$            ;;TYPE ASCIZ STRING
        046314  000412                          BR      78$             ;;GET OVER THE ASCIZ
                                        ;;79$:  .ASCIZ  /    CA121(12:1)   /
        046342                          78$:
 8887   046342  000207                          RTS PC
 8888   046344                          9$:
        046344  104401  046352                  TYPE    ,81$            ;;TYPE ASCIZ STRING
        046350  000412                          BR      80$             ;;GET OVER THE ASCIZ
                                        ;;81$:  .ASCIZ  /      EXDAT1      /
        046376                          80$:
 8889   046376  000207                          RTS PC
 8890   046400                          10$:
        046400  104401  046406                  TYPE    ,83$            ;;TYPE ASCIZ STRING
        046404  000412                          BR      82$             ;;GET OVER THE ASCIZ
                                        ;;83$:  .ASCIZ  /   CM1513(15:13)  /
        046432                          82$:
 8891   046432  000207                          RTS PC
 8892   046434                          11$:
        046434  104401  046442                  TYPE    ,85$            ;;TYPE ASCIZ STRING
        046440  000412                          BR      84$             ;;GET OVER THE ASCIZ
                                        ;;85$:  .ASCIZ  /    CNT121(12:1)   /
        046466                          84$:
 8893   046466  000207                          RTS PC
 8894   046470                          12$:
        046470  104401  046476                  TYPE    ,87$            ;;TYPE ASCIZ STRING
        046474  000412                          BR      86$             ;;GET OVER THE ASCIZ
                                        ;;87$:  .ASCIZ  /      FLTPAT      /
        046522                          86$:
 8895   046522  000207                          RTS PC
 8896   046524                          13$:
        046524  104401  046532                  TYPE    ,89$            ;;TYPE ASCIZ STRING
        046530  000406                          BR      88$             ;;GET OVER THE ASCIZ
                                        ;;89$:  .ASCIZ  /      RECDAT      /
        046546                          88$:
 8897   046546  000207                          RTS PC
 8898   046550                          14$:
        046550  104401  046556                  TYPE    ,91$            ;;TYPE ASCIZ STRING
        046554  000411                          BR      90$             ;;GET OVER THE ASCIZ
                                        ;;91$:  .ASCIZ  /      EXDAT3     /
        046600                          90$:
 8899   046600  000207                          RTS PC
 8900   046602                          15$:
        046602  104401  046610                  TYPE    ,93$            ;;TYPE ASCIZ STRING
        046606  000407                          BR      92$             ;;GET OVER THE ASCIZ
                                        ;;93$:  .ASCIZ  /      CHR50         /
        046626                          92$:
```

```
 8901 046626  000207                          RTS PC
 8902 046630                            16$:
      046630  104401  046636                  TYPE    ,95$            ;;TYPE ASCIZ STRING
      046634  000411                          BR      94$             ;;GET OVER THE ASCIZ
                                       ;;95$: .ASCIZ  /     CMR119     /
      046660                           94$:
 8903 046660  000207                          RTS PC
 8904 046662                            17$:
      046662  104401  046670                  TYPE    ,97$            ;;TYPE ASCIZ STRING
      046666  000411                          BR      96$             ;;GET OVER THE ASCIZ
                                       ;;97$: .ASCIZ  /    FAILAD     /
      046712                           96$:
 8905 046712  000207                          RTS PC
 8906                                         .EVEN
 8907
 8908
 8909 046714  046756                  PRDATA: 1$
 8910 046716  047000                          2$
 8911 046720  047022                          3$
 8912 046722  047034                          4$
 8913 046724  047046                          5$
 8914 046726  047060                          6$
 8915 046730  047070                          7$
 8916 046732  047100                          8$
 8917 046734  047112                          9$
 8918 046736  047124                          10$
 8919 046740  047136                          11$
 8920 046742  047150                          12$
 8921 046744  047160                          13$
 8922 046746  047170                          14$
 8923 046750  047202                          15$
 8924 046752  047214                          16$
 8925 046754  047226                          17$
 8926 046756                            1$:
      046756  013746  047300          MOV     CA210,-(SP)     ;;SAVE CA210 FOR TYPEOUT
      046762  104403                  TYPOS                   ;;GO TYPE--OCTAL ASCII
      046764     003                  .BYTE   3               ;;TYPE 3 DIGIT(S)
      046765     001                  .BYTE   1               ;;TYPE LEADING ZEROS
 8927 046766  013746  047302          MOV     CA210+2,-(SP)   ;;SAVE CA210+2 FOR TYPEOUT
      046772  104403                  TYPOS                   ;;GO TYPE--OCTAL ASCII
      046774     005                  .BYTE   5               ;;TYPE 5 DIGIT(S)
      046775     001                  .BYTE   1               ;;TYPE LEADING ZEROS
 8928 046776  000207                          RTS PC
 8929 047000                            2$:
      047000  013746  047304          MOV     AMR210,-(SP)    ;;SAVE AMR210 FOR TYPEOUT
      047004  104403                  TYPOS                   ;;GO TYPE--OCTAL ASCII
      047006     003                  .BYTE   3               ;;TYPE 3 DIGIT(S)
      047007     001                  .BYTE   1               ;;TYPE LEADING ZEROS
 8930 047010  013746  047306          MOV     AMR210+2,-(SP)  ;;SAVE AMR210+2 FOR TYPEOUT
      047014  104403                  TYPOS                   ;;GO TYPE--OCTAL ASCII
      047016     005                  .BYTE   5               ;;TYPE 5 DIGIT(S)
      047017     001                  .BYTE   1               ;;TYPE LEADING ZEROS
 8931 047020  000207                          RTS PC
 8932 047022                            3$:
      047022  013746  047310          MOV     CHR157,-(SP)    ;;SAVE CHR157 FOR TYPEOUT
      047026  104403                  TYPOS                   ;;GO TYPE--OCTAL ASCII
      047030     003                  .BYTE   3               ;;TYPE 3 DIGIT(S)
```

```
                047031   001
8933            047032   000207
8934            047034
                047034   013746   047312
                047040   104403
                047042   003
                047043   001
8935            047044   000207
8936            047046
                047046   013746   047314
                047052   104403
                047054   003
                047055   001
8937            047056   000207
8938            047060
                047060   013746   047316
                047064   104402
8939            047066   000207
8940            047070
                047070   013746   047320
                047074   104402
8941            047076   000207
8942            047100
                047100   013746   047322
                047104   104403
                047106   004
                047107   001
8943            047110   000207
8944            047112
                047112   013746   047324
                047116   104403
                047120   001
                047121   001
8945            047122   000207
8946            047124
                047124   013746   047326
                047130   104403
                047132   001
                047133   001
8947            047134   000207
8948            047136
                047136   013746   047330
                047142   104403
                047144   004
                047145   001
8949            047146   000207
8950            047150
                047150   013746   047332
                047154   104402
8951            047156   000207
8952            047160
                047160   013746   047334
                047164   104402
8953            047166   000207
8954            047170
                047170   013746   047336
                047174   104403
```

```
        .BYTE   1               ;;TYPE LEADING ZEROS
        RTS PC
4$:
        MOV     CA2113,-(SP)    ;;SAVE CA2113 FOR TYPEOUT
        TYPOS                   ;;GO TYPE--OCTAL ASCII
        .BYTE   3               ;;TYPE 3 DIGIT(S)
        .BYTE   1               ;;TYPE LEADING ZEROS
        RTS PC
5$:
        MOV     CHR80,-(SP)     ;;SAVE CHR80 FOR TYPEOUT
        TYPOS                   ;;GO TYPE--OCTAL ASCII
        .BYTE   3               ;;TYPE 3 DIGIT(S)
        .BYTE   1               ;;TYPE LEADING ZEROS
        RTS PC
6$:
        MOV     CDR150,-(SP)    ;;SAVE CDR150 FOR TYPEOUT
        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
        RTS PC
7$:
        MOV     EXDAT6,-(SP)    ;;SAVE EXDAT6 FOR TYPEOUT
        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
        RTS PC
8$:
        MOV     CA121,-(SP)     ;;SAVE CA121 FOR TYPEOUT
        TYPOS                   ;;GO TYPE--OCTAL ASCII
        .BYTE   4               ;;TYPE 4 DIGIT(S)
        .BYTE   1               ;;TYPE LEADING ZEROS
        RTS PC
9$:
        MOV     EXDAT1,-(SP)    ;;SAVE EXDAT1 FOR TYPEOUT
        TYPOS                   ;;GO TYPE--OCTAL ASCII
        .BYTE   1               ;;TYPE 1 DIGIT(S)
        .BYTE   1               ;;TYPE LEADING ZEROS
        RTS PC
10$:
        MOV     CM1513,-(SP)    ;;SAVE CM1513 FOR TYPEOUT
        TYPOS                   ;;GO TYPE--OCTAL ASCII
        .BYTE   1               ;;TYPE 1 DIGIT(S)
        .BYTE   1               ;;TYPE LEADING ZEROS
        RTS PC
11$:
        MOV     CNT121,-(SP)    ;;SAVE CNT121 FOR TYPEOUT
        TYPOS                   ;;GO TYPE--OCTAL ASCII
        .BYTE   4               ;;TYPE 4 DIGIT(S)
        .BYTE   1               ;;TYPE LEADING ZEROS
        RTS PC
12$:
        MOV     FLTPAT,-(SP)    ;;SAVE FLTPAT FOR TYPEOUT
        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
        RTS PC
13$:
        MOV     RECDAT,-(SP)    ;;SAVE RECDAT FOR TYPEOUT
        TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
        RTS PC
14$:
        MOV     EXDAT3,-(SP)    ;;SAVE EXDAT3 FOR TYPEOUT
        TYPOS                   ;;GO TYPE--OCTAL ASCII
```

```
                047176   003                        .BYTE   3               ;;TYPE 3 DIGIT(S)
                047177   001                        .BYTE   1               ;;TYPE LEADING ZEROS
8955            047200   000207                     RTS PC
8956            047202                      15$:
                047202   013746  047340             MOV     CHR50,-(SP)     ;;SAVE CHR50 FOR TYPEOUT
                047206   104403                     TYPOS                   ;;GO TYPE--OCTAL ASCII
                047210   002                        .BYTE   2               ;;TYPE 2 DIGIT(S)
                047211   001                        .BYTE   1               ;;TYPE LEADING ZEROS
8957            047212   000207                     RTS PC
8958            047214                      16$:
                047214   013746  047342             MOV     CMR119,-(SP)    ;;SAVE CMR119 FOR TYPEOUT
                047220   104403                     TYPOS                   ;;GO TYPE--OCTAL ASCII
                047222   001                        .BYTE   1               ;;TYPE 1 DIGIT(S)
                047223   001                        .BYTE   1               ;;TYPE LEADING ZEROS
8959            047224   000207                     RTS PC
8960            047226                      17$:
                047226   013746  047344             MOV     FAILAD,-(SP)    ;;SAVE FAILAD FOR TYPEOUT
                047232   104402                     TYPOC                   ;;GO TYPE--OCTAL ASCII(ALL DIGITS)
8961            047234   000207                     RTS PC
8962
8963
8964            047236   047300             PRTABL: CA210
8965            047240   047304                     AMR210
8966            047242   047310                     CHR157
8967            047244   047312                     CA2113
8968            047246   047314                     CHR80
8969            047250   047316                     CDR150
8970            047252   047320                     EXDAT6
8971            047254   047322                     CA121
8972            047256   047324                     EXDAT1
8973            047260   047326                     CM1513
8974            047262   047330                     CNT121
8975            047264   047332                     FLTPAT
8976            047266   047334                     RECDAT
8977            047270   047336                     EXDAT3
8978            047272   047340                     CHR50
8979            047274   047342                     CMR119
8980            047276   047344                     FAILAD
8981
8982            047300   000000             CA210:  .WORD   0
8983            047302   000000                     .WORD   0
8984            047304   000000             AMR210: .WORD   0
8985            047306   000000                     .WORD   0
8986            047310   000000             CHR157: .WORD   0
8987            047312   000000             CA2113: .WORD   0
8988            047314   000000             CHR80:  .WORD   0
8989            047316   000000             CDR150: .WORD   0
8990            047320   000000             EXDAT6: .WORD   0
8991            047322   000000             CA121:  .WORD   0
8992            047324   000000             EXDAT1: .WORD   0
8993            047326   000000             CM1513: .WORD   0
8994            047330   000000             CNT121: .WORD   0
8995            047332   000000             FLTPAT: .WORD   0
8996            047334   000000             RECDAT: .WORD   0
8997            047336   000000             EXDAT3: .WORD   0
8998            047340   000000             CHR50:  .WORD   0
8999            047342   000000             CMR119: .WORD   0
```

```
 9000 047344  000000                FAILAD: .WORD   0
 9001
 9002
 9003
 9004
 9005                                ;;*****************************************************************************
 9006
 9007          060000                                .=60000
 9008 060000   000000                LOW1:           .WORD 0
 9009          070000                                .=70000
 9010 070000   000000                HIGH1:          .WORD 0
 9011          000001                                .END
```

```
ABASE = 000000
ACDW1 = 000000
ACDW2 = 000000
ACPUOP= 000000
ADDW0 = 000000
ADDW1 = 000000
ADDW10= 000000
ADDW11= 000000
ADDW12= 000000
ADDW13= 000000
ADDW14= 000000
ADDW15= 000000
ADDW2 = 000000
ADDW3 = 000000
ADDW4 = 000000
ADDW5 = 000000
ADDW6 = 000000
ADDW7 = 000000
ADDW8 = 000000
ADDW9 = 000000
ADEVCT= 000000
ADEVM = 000000
ADRJMP  002124
ADRSYN  002122
ADR1$   002126
AENV  = 000000
AENVM = 000000
AFATAL= 000000
AM    = 000010
AMADR1= 000000
AMADR2= 000000
AMADR3= 000000
AMADR4= 000000
AMAMS1= 000000
AMAMS2= 000000
AMAMS3= 000000
AMAMS4= 000000
AMR210  047304
AMSGAD= 000000
AMSGLG= 000000
AMSGTY= 000000
AMTYP1= 000000
AMTYP2= 000000
AMTYP3= 000000
AMTYP4= 000000
APASS = 000000
APRIOR= 000000
APTCSU= 000040
APTENV= 000001
APTSIZ= 000200
APTSPO= 000100
ASWREG= 000000
ATESTN= 000000
AUNIT = 000000
AUSWR = 000000
AVECT1= 000000
AVECT2= 000000

BEBA  = 170004
BECC  = 170002
BECR1 = 170006
BECR2 = 170016
BEDA  = 170000
BEGIN   002400
BIT00 = 000001
BIT01 = 000002
BIT02 = 000004
BIT03 = 000010
BIT04 = 000020
BIT05 = 000040
BIT06 = 000100
BIT07 = 000200
BIT08 = 000400
BIT09 = 001000
BIT10 = 002000
BIT11 = 004000
BIT12 = 010000
BIT13 = 020000
BIT14 = 040000
BIT15 = 100000
CA121   047322
CA210   047300
CA2113  047312
CCR   = 177746
CDR   = 177754
CDR150  047316
CHR   = 177752
CHRPAT  002056
CHR157  047310
CHR50   047340
CHR80   047314
CME   = 177744
CMPE  = 100000
CMR   = 177750
CMRPAT  002054
CMR119  047342
CM1   = 100000
CM1513  047326
CM2   = 040000
CM3   = 020000
CNT121  047330
CR    = 000015
CRLF  = 000200
DAT     045416
DCPI  = 000001
DISPRE  000174
EHA   = 000004
ENDPAS  044034
ERROR = 104000
ERRPC   045250
ESA   = 000020
EXDAT1  047324
EXDAT3  047336
EXDAT6  047320
FAILAD  047344

FAIL1   002060
FAIL2   002062
FC    = 000400
FIN     045570
FLTPAT  047332
FMHI  = 000010
FMLO  = 000004
HIGH1   070000
HIT   = 000400
HODO  = 000002
HPB   = 004000
HT    = 000011
INHERR  045556
KPAR0 = 172340
KPAR1 = 172342
KPAR2 = 172344
KPAR3 = 172346
KPAR4 = 172350
KPAR5 = 172352
KPAR6 = 172354
KPAR7 = 172356
KPDR0 = 172300
KPDR1 = 172302
KPDR2 = 172304
KPDR3 = 172306
KPDR4 = 172310
KPDR5 = 172312
KPDR6 = 172314
KPDR7 = 172316
LF    = 000012
LOOP    002052
LOW1    060000
LPB   = 002000
MAGPRE  006774
OFF   = 001015
PEA   = 000200
PEHI  = 000200
PELO  = 000100
PRDATA  046714
PRTABL  047236
PRTITL  045742
PSW   = 177776
RECDAT  047334
RELCTH  002352
RELCTL  002324
SAVR0   045304
SAVR1   045306
SAVR2   045310
SAVR3   045312
SAVR4   045314
SAVR5   045316
SCPCND= 000004
SR0   = 177572
SR3   = 172516
START   001000
STRTLP  002120
STRTST  002116

SWR     002064
SWREG   000176
TDAR  = 000001
TITL    045320
TPB   = 001000
TPE   = 000040
TSTCNT  002130
TSTID = 000230
TSTIMS  002132
TYPDS = 104405
TYPE  = 104401
TYPOC = 104402
TYPON = 104404
TYPOS = 104403
T1      002476
T10     003264
T100    012632
T101    013056
T102    013240
T103    013556
T104    014334
T105    014546
T106    014700
T107    015036
T11     003326
T110    015222
T111    015420
T112    015620
T113    016016
T114    016216
T115    016440
T116    016634
T117    017230
T12     003406
T120    017324
T121    017402
T122    017510
T123    017616
T124    020034
T125    020236
T126    020454
T127    020656
T13     003502
T130    021124
T131    021402
T132    021660
T133    022076
T134    022300
T135    022516
T136    022720
T137    023166
T14     003552
T140    023444
T141    023722
T142    024146
T143    024356
T144    024556

T145    025030
T146    025212
T147    025532
T15     003646
T150    026052
T151    026446
T152    027042
T153    027204
T154    027376
T155    027562
T156    027742
T157    030070
T16     003716
T160    030244
T161    030410
T162    030640
T163    031070
T164    031324
T165    031560
T166    032034
T167    032240
T17     003766
T170    032342
T171    032542
T172    033100
T173    033436
T174    033726
T175    034216
T176    034574
T177    035226
T2      002572
T20     004036
T200    035660
T201    036214
T202    036550
T203    037104
T204    037440
T205    037562
T206    037704
T207    040026
T21     004116
T210    040212
T211    040376
T212    040520
T213    040650
T214    041016
T215    041230
T216    041346
T217    041464
T22     004162
T220    041746
T221    042114
T222    042644
T223    043240
T224    043404
T225    043552
T226    043706
```

```
T227    044010          T60     006554          $ATYC   001630          $ENV    001500          $OMODE  044752
T23     004232          T61     006624          $ATY1   001604          $ENVM   001501          $PASS   001466
T24     004302          T62     006674          $ATY3   001612          $ERROR  045252          $PASTM  001452
T25     004352          T63     007172          $ATY4   001622          $ETABL  001500          $QUES   002106
T26     004422          T64     007260          $BASE   001534          $ETEND  001604          $SCPSE  002134
T27     004472          T65     007456          $BELL   002102          $FATAL  001462          $SWR  = 160000
T3      002666          T66     007636          $CDW1   001540          $FFLG   002050          $SWREG  001502
T30     004542          T67     010102          $CDW2   001542          $FILLC  002100          $TESTN  001464
T31     004612          T7      003222          $CHARC  044522          $FILLS  002077          $TIMES  044170
T32     004662          T70     010460          $CPUOP  001506          $HD   = 000003          $TKB    002070
T33     004732          T71     010626          $CRLF   002107          $HIBTS  001444          $TKS    002066
T34     005002          T72     011156          $DBLK   045170          $ICNT   044172          $TN   = 000001
T35     005052          T73     011344          $DDW0   001544          $LF     002110          $TPB    002074
T36     005122          T74     011536          $DDW1   001546          $LFLG   002047          $TPFLG  002101
T37     005172          T75     011746          $DDW10  001570          $MADR1  001512          $TPS    002072
T4      002762          T76     012166          $DDW11  001572          $MADR2  001516          $TRAP   045200
T40     005242          T77     012412          $DDW12  001574          $MADR3  001522          $TRAP2  045222
T41     005312          UCB   = 001000          $DDW13  001576          $MADR4  001526          $TRP  = 000006
T42     005362          UMPR00= 170200          $DDW14  001600          $MAIL   001460          $TRPAD  045234
T43     005432          UMPR01= 170202          $DDW15  001602          $MAMS1  001510          $TSTM   001450
T44     005502          UMPR02= 170204          $DDW2   001550          $MAMS2  001514          $TYPDS  044754
T45     005552          UMPR03= 170206          $DDW3   001552          $MAMS3  001520          $TYPE   044174
T46     005622          UMPR04= 170210          $DDW4   001554          $MAMS4  001524          $TYPEC  044406
T47     005672          UMPR05= 170212          $DDW5   001556          $MBADR  001446          $TYPEX  044524
T5      003056          UMPR06= 170214          $DDW6   001560          $MFLG   002046          $TYPOC  044552
T50     005750          UMPR07= 170216          $DDW7   001562          $MSGAD  001474          $TYPON  044566
T51     006026          UMPR08= 170220          $DDW8   001564          $MSGLG  001476          $TYPOS  044526
T52     006104          UMPR09= 170222          $DDW9   001566          $MSGTY  001460          $UNIT   001472
T53     006162          VCIP  = 010000          $DEVCT  001470          $MTYP1  001511          $UNITM  001454
T54     006240          VLD   = 010000          $DEVM   001536          $MTYP2  001515          $USWR   001504
T55     006316          VSIU  = 020000          $DOAGN  044164          $MTYP3  001521          $VECT1  001530
T56     006406          WWPD  = 000100          $DTBL   045160          $MTYP4  001525          $VECT2  001532
T57     006504          WWPT  = 002000          $ENDAD  044154          $NULL   002076          $OFILL  044751
T6      003152          $APTHD  001444          $ENULL  002112          $OCNT   044750          .$X   = 001444

. ABS.  070002      000
        000000      001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  63523 WORDS  ( 249 PAGES)
DYNAMIC MEMORY:  20434 WORDS  ( 78 PAGES)
ELAPSED TIME:  00:12:30
CKKKAA0,CKKKAA0/NL:TOC/CRF/-SP=CKKKAA0.SML,CKKKAA0.P11
```

CKKKAA0 CREATED BY MACRO ON 26-SEP-79 AT 09:01 PAGE 1
SYMBOL CROSS REFERENCE CREF SEQ 0238

SYMBOL	VALUE	REFERENCES								
ABASE	= 000000	70-619	70-619							
ACDW1	= 000000	70-619	70-619							
ACDW2	= 000000	70-619	70-619							
ACPUOP	= 000000	70-619	70-619							
ADDW0	= 000000	70-619	70-619							
ADDW1	= 000000	70-619	70-619							
ADDW10	= 000000	70-619	70-619							
ADDW11	= 000000	70-619	70-619							
ADDW12	= 000000	70-619	70-619							
ADDW13	= 000000	70-619	70-619							
ADDW14	= 000000	70-619	70-619							
ADDW15	= 000000	70-619	70-619							
ADDW2	= 000000	70-619	70-619							
ADDW3	= 000000	70-619	70-619							
ADDW4	= 000000	70-619	70-619							
ADDW5	= 000000	70-619	70-619							
ADDW6	= 000000	70-619	70-619							
ADDW7	= 000000	70-619	70-619							
ADDW8	= 000000	70-619	70-619							
ADDW9	= 000000	70-619	70-619							
ADEVCT	= 000000	70-619	70-619							
ADEVM	= 000000	70-619	70-619							
ADRJMP	002124	#72-775	*72-810	72-812	72-814	90-8835	90-8839			
ADRSYN	002122	#72-774	*72-809	90-8841						
ADR1$	002126	#72-776	*72-812	*72-813	72-815	90-8836	90-8840			
AENV	= 000000	70-619	70-619							
AENVM	= 000000	70-619	70-619							
AFATAL	= 000000	70-619	70-619							
AM	= 000010	#71-739	75-1755	75-1860	77-1919	77-1959	77-2003	77-2060	77-2133	77-2188
		77-2246								
AMADR1	= 000000	70-619	70-619							
AMADR2	= 000000	70-619	70-619							
AMADR3	= 000000	70-619	70-619							
AMADR4	= 000000	70-619	70-619							
AMAMS1	= 000000	70-619	70-619							
AMAMS2	= 000000	70-619	70-619							
AMAMS3	= 000000	70-619	70-619							
AMAMS4	= 000000	70-619	70-619							
AMR210	047304	*77-1963	*77-1965	*77-1967	*77-1968	77-1976	*77-2007	*77-2008	*77-2009	77-2015
		*77-2062	*77-2064	77-2071	*77-2138	*77-2140	*77-2144	77-2151	*77-2190	*77-2192
		77-2201	*77-2250	*77-2253	*77-2256	*77-2258	77-2267	90-8929	90-8930	90-8965
		#90-8984								
AMSGAD	= 000000	70-619	70-619							
AMSGLG	= 000000	70-619	70-619							
AMSGTY	= 000000	70-619	70-619							
AMTYP1	= 000000	70-619	70-619							
AMTYP2	= 000000	70-619	70-619							
AMTYP3	= 000000	70-619	70-619							
AMTYP4	= 000000	70-619	70-619							
APASS	= 000000	70-619	70-619							
APRIOR	= 000000	70-619								
APTCSU	= 000040	#70-620	#71-721	90-8740						

CKKKAAO CREATED BY MACRO ON 26-SEP-79 AT 09:01 PAGE 2
SYMBOL CROSS REFERENCE CREF SEQ 0239

SYMBOL	VALUE	REFERENCES								
APTENV	= 000001	70-620	#70-620	#71-719	90-8740	90-8823				
APTSIZ	= 000200	69-605	#70-620	#71-718	79-2764	88-8345	89-8447			
APTSPO	= 000100	70-620	#70-620	#71-720	90-8740					
ASWREG	= 000000	70-619	70-619							
ATESTN	= 000000	70-619	70-619							
AUNIT	= 000000	70-619	70-619							
AUSWR	= 000000	70-619	70-619							
AVECT1	= 000000	70-619	70-619							
AVECT2	= 000000	70-619	70-619							
BEBA	= 170004	#71-713	*89-8384	*89-8471						
BECC	= 170002	#71-712	*89-8386	*89-8473						
BECR1	= 170006	#71-715	88-8353	*89-8389	89-8390	89-8455	*89-8476	89-8477		
BECR2	= 170016	#71-716	*89-8388	*89-8475	89-8482					
BEDA	= 170000	#71-714	*89-8387	*89-8474						
BEGIN	002400	69-616	#73-847	89-8730						
BIT00	= 000001	#71-666	74-1077	74-1080	75-1451	75-1453	75-1650	75-1654	75-1670	75-1674
BIT01	= 000002	#71-667	75-1303	75-1305	75-1462	75-1464	75-1690	75-1694	75-1710	75-1714
BIT02	= 000004	#71-668	74-1097	74-1101	74-1120	75-1473	75-1475	75-1598	75-1599	75-1601
		75-1619	75-1620							
BIT03	= 000010	#71-669	74-1139	74-1143	74-1163	75-1484	75-1486	75-1736	75-1759	
BIT04	= 000020	#71-670	75-1325	75-1327	75-1495	75-1497				
BIT05	= 000040	#71-671	75-1345	75-1347	75-1786	75-1788				
BIT06	= 000100	#71-672	74-1180	74-1182	75-1797	75-1799				
BIT07	= 000200	#71-673	74-1201	74-1203	74-1220	74-1224	75-1808	75-1810		
BIT08	= 000400	#71-674	74-1076	75-1242	75-1244	75-1365	75-1367	75-1506	75-1508	82-4651
BIT09	= 001000	#71-675	75-1262	75-1517	75-1519	90-8830				
BIT10	= 002000	#71-676	75-1277	75-1279	75-1528	75-1530	75-1622			
BIT11	= 004000	#71-677	72-798	75-1385	75-1387	75-1539	75-1541	89-8711		
BIT12	= 010000	#71-678	74-1056	75-1550	75-1552					
BIT13	= 020000	#71-679	75-1561	75-1563	90-8765					
BIT14	= 040000	#71-680	72-786	75-1403	75-1405	75-1572	75-1574			
BIT15	= 100000	#71-681	75-1423	75-1425	90-8827					
CA121	047322	*79-2910	*79-2911	79-2916	*80-3273	*80-3274	80-3279	*80-3615	*80-3617	80-3622
		*80-3665	*80-3667	80-3672	*80-3722	*80-3724	80-3729	*80-3772	*80-3774	80-3779
		*80-3832	*80-3833	80-3841	*81-4046	*81-4048	81-4053	*81-4096	*81-4098	81-4103
		*81-4153	*81-4155	81-4160	*81-4203	*81-4205	81-4210	*81-4263	*81-4264	81-4272
		*82-4798	*82-4799	82-4814	*82-4824	*82-4825	82-4837	*82-4905	*82-4906	82-4921
		*82-4931	*82-4932	83-4945	*83-5027	*83-5028	83-5043	*83-5061	*83-5062	83-5075
		*83-5152	*83-5153	83-5168	*83-5186	*83-5187	83-5200	*84-5677	*84-5678	84-5686
		84-5698	84-5707	*84-5760	*84-5761	84-5769	84-5780	84-5789	*84-5845	*84-5846
		84-5854	84-5866	84-5875	*84-5928	*84-5929	84-5937	84-5948	84-5957	*84-6031
		*84-6032	84-6040	*84-6051	*84-6052	84-6060	*84-6120	*84-6121	84-6129	*86-6826
		*86-6827	86-6842	*86-6859	*86-6860	86-6872	*86-6964	*86-6965	86-6980	*86-6997
		*86-6998	86-7010	*87-7101	*87-7102	87-7114	*87-7123	*87-7124	87-7133	*87-7213
		*87-7214	87-7226	*87-7235	*87-7236	87-7245	*87-7334	*87-7335	87-7347	*87-7356
		*87-7357	87-7366	*87-7446	*87-7447	87-7459	*87-7468	*87-7469	87-7478	*89-8409
		*89-8411	89-8418	90-8942	90-8971	#90-8991				
CA210	047300	*77-1961	*77-1962	77-1975	*77-2005	*77-2006	77-2014	*77-2065	*77-2066	77-2070
		*77-2139	*77-2141	*77-2143	77-2150	*77-2193	*77-2194	77-2199	*77-2252	*77-2254
		*77-2257	*77-2259	77-2265	*77-2446	*77-2447	77-2458	*77-2497	*77-2498	77-2508
		*77-2547	*77-2548	78-2560	*79-2600	*79-2601	79-2611	*79-3079	*79-3080	79-3085
		*79-3122	*79-3123	79-3128	*79-3167	*79-3168	79-3174	*79-3212	*79-3213	80-3219

SYMBOL CROSS REFERENCE

SYMBOL VALUE

CA2113 047312

CCR = 177746

REFERENCES

SYMBOL	VALUE	REFERENCES
		*87-7591 *87-7601 *87-7639 *87-7645 *87-7654 *87-7691 *87-7696 *87-7699 *88-7705
		*88-7714 *88-7716 88-7718 *88-7756 *88-7762 *88-7765 *88-7771 *88-7782 *88-7784
		88-7786 *88-7827 *88-7833 *88-7841 *88-7883 *88-7889 *88-7893 *88-7897 *88-7941
		*88-7949 *88-7954 *88-7958 *88-7966 *88-8007 *88-8022 *88-8040 *88-8082 *88-8087
		*88-8099 *88-8141 *88-8146 *88-8159 *88-8191 *88-8207 *88-8240 *88-8275 *88-8281
		*88-8294 *88-8336 88-8337 *88-8339 88-8340 *89-8372 *89-8404 *89-8438 89-8439
		*89-8441 89-8442 *89-8467 89-8483 *89-8492 *89-8528 *89-8534 *89-8546 *89-8572
		*89-8578 *89-8590 *89-8641
CDR	= 177754	#71-656 74-983 79-2960 79-2995 79-3031 79-3073 79-3116 79-3161 79-3206
		80-3266 81-4459 81-4465 82-4784 82-4789 82-4891 82-4896
CDR150	047316	*79-2960 79-2964 79-2970 *79-2995 79-2999 79-3005 *79-3031 79-3035 79-3043
		*79-3073 79-3077 79-3086 *79-3116 79-3120 79-3129 *79-3161 79-3165 79-3175
		*79-3206 79-3210 80-3220 *81-4473 81-4480 *81-4485 81-4492 *82-4796 82-4812
		*82-4822 82-4835 *82-4903 82-4919 *82-4929 83-4943 90-8938 90-8969 #90-8989
CHR	= 177752	#71-655 74-957 *75-1730 *75-1752 *75-1841 *75-1844 *77-1913 *77-1944 *77-1996
		*77-2044 *77-2108 *77-2176 *77-2232 *77-2298 77-2310 *77-2338 77-2350 *77-2380
		77-2392 *77-2425 77-2439 *77-2476 77-2490 *77-2526 77-2540 *79-2579 79-2593
		79-2653 79-2712 79-2803 79-2903 *80-3590 *80-3697 *81-4021 *81-4128 *81-4510
		81-4526 82-4577 *83-4983 *83-5001 83-5008 83-5011 *83-5108 *83-5126 83-5133
		83-5136 *83-5498 *83-5551 *84-5602 *84-5654 *84-5737 *84-5820 *84-5905 *86-6764
		*86-6785 *86-6902 *86-6923 89-8544 89-8588 *90-8841
CHRPAT	002056	#70-628 *77-1942 77-1944 77-1963 77-1965 *77-1979 *77-2103 77-2108 77-2138
		77-2139 *77-2159 *77-2220 77-2232 *77-2272
CHR157	047310	*77-2310 *77-2314 77-2315 *77-2318 *77-2319 77-2326 *77-2350 *77-2354 77-2355
		*77-2358 *77-2359 77-2366 *77-2392 *77-2397 *77-2398 77-2401 77-2408 *77-2439
		*77-2443 77-2444 *77-2449 *77-2450 77-2457 *77-2490 *77-2494 77-2495 *77-2500
		*77-2501 77-2509 *77-2540 *77-2544 77-2545 *77-2550 *77-2551 78-2559 *79-2593
		*79-2597 79-2598 *79-2603 *79-2604 79-2612 *79-2653 *79-2657 79-2658 *79-2661
		*79-2662 79-2669 *79-2712 *79-2718 79-2719 *79-2725 *79-2727 79-2736 *79-2803
		*79-2810 79-2811 *79-2817 *79-2819 79-2828 *81-4526 *82-4531 82-4532 *82-4535
		*82-4536 82-4548 *82-4577 *82-4581 82-4582 *82-4585 *82-4586 82-4595 *83-5019
		*83-5022 *83-5023 83-5041 *83-5053 *83-5056 *83-5057 83-5074 *83-5144 *83-5147
		*83-5148 83-5166 *83-5178 *83-5181 *83-5182 83-5199 90-8932 90-8966 #90-8986
CHR50	047340	*89-8553 89-8557 *89-8597 89-8601 90-8956 90-8978 #90-8998
CHR80	047314	*77-2378 77-2380 77-2401 77-2409 *77-2412 77-2413 90-8936 90-8968 #90-8988
CME	= 177744	#71-652 74-879 *74-1009 74-1011 *75-1451 75-1453 *75-1462 75-1464 *75-1473
		75-1475 *75-1484 75-1486 *75-1495 75-1497 *75-1506 75-1508 *75-1517 75-1519
		*75-1528 75-1530 *75-1539 75-1541 *75-1550 75-1552 *75-1561 75-1563 *75-1572
		75-1574 *84-6169 84-6170 *84-6215 84-6224 *85-6296 85-6302 85-6307 *85-6310
		85-6311 *85-6413 85-6420 85-6425 *85-6428 85-6429 *86-6524 *86-6592 *86-6670
		86-6690 *86-6691 86-6692 *88-7706 *88-7772
CMPE	= 100000	#71-754 86-6703 86-6711
CMR	= 177750	#71-654 74-931 *75-1650 75-1651 *75-1653 *75-1670 75-1671 *75-1673 *75-1690
		75-1691 *75-1693 *75-1710 75-1711 *75-1713 *75-1731 *75-1732 75-1733 *75-1735
		*75-1753 *75-1754 *75-1755 75-1756 *75-1758 *75-1786 75-1788 *75-1797 75-1799
		*75-1808 75-1810 *75-1842 *75-1843 *75-1845 75-1858 *77-1914 *77-1915 77-1919
		*77-1945 *77-1946 77-1957 *77-1995 *77-1997 77-2001 *77-2045 *77-2046 77-2056
		*77-2107 *77-2111 77-2129 *77-2177 *77-2178 77-2188 *77-2231 *77-2235 77-2246
		*77-2299 *77-2312 *77-2339 *77-2352 *77-2382 *77-2394 *77-2429 *77-2441 *77-2480
		*77-2492 *77-2530 *77-2542 *79-2583 *79-2595 *79-2643 *79-2655 *79-2697 *79-2717
		*79-2792 *79-2809 *79-2891 *79-2905 *79-2950 *79-2962 *79-2985 *79-2997 *79-3021
		*79-3033 *79-3066 *79-3075 *79-3109 *79-3118 *79-3154 *79-3163 *79-3199 *79-3208

SYMBOL	VALUE	REFERENCES								
		*80-3253	*80-3268	*80-3319	80-3330	*80-3332	*80-3392	80-3409	*80-3414	*80-3446
		*80-3592	*80-3596	80-3608	*80-3610	*80-3649	80-3658	*80-3660	*80-3699	*80-3703
		80-3715	*80-3717	*80-3756	80-3765	*80-3767	*80-3807	*80-3811	*80-3816	80-3824
		*80-3826	*81-3880	81-3903	*81-3906	*81-3948	81-3971	*81-3974	*81-4023	*81-4027
		81-4039	*81-4041	*81-4080	81-4089	*81-4091	*81-4130	*81-4134	81-4146	*81-4148
		*81-4187	81-4196	*81-4198	*81-4238	*81-4242	*81-4247	81-4255	*81-4257	*81-4310
		81-4333	*81-4336	*81-4375	81-4398	*81-4401	*81-4447	*81-4467	*81-4511	*81-4518
		*82-4530	*82-4561	*82-4579	*82-4628	82-4642	82-4646	*82-4649	*82-4707	82-4721
		*82-4724	*82-4768	*82-4794	*82-4820	*82-4844	*82-4875	*82-4901	*82-4927	*83-4952
		*83-4987	*83-5017	*83-5051	*83-5082	*83-5112	*83-5142	*83-5176	*83-5207	*83-5246
		83-5257	*83-5259	*83-5303	83-5315	*83-5317	*83-5369	83-5381	*83-5383	*83-5430
		83-5442	*83-5445	*83-5499	83-5512	*83-5514	*83-5553	83-5566	*83-5568	*84-5603
		84-5617	*84-5620	*84-5661	84-5673	*84-5675	*84-5744	84-5756	*84-5758	*84-5829
		84-5841	*84-5843	*84-5912	84-5924	*84-5926	*84-6008	84-6023	*84-6025	*84-6098
		84-6113	*84-6115	*84-6164	*84-6172	*84-6207	*84-6227	*85-6284	*85-6314	*85-6400
		*85-6432	*86-6511	*86-6539	*86-6579	*86-6606	*86-6656	*86-6695	*86-6771	*86-6787
		86-6795	*86-6796	86-6808	*86-6816	*86-6850	*86-6879	*86-6909	*86-6925	86-6933
		*86-6934	86-6946	*86-6954	*86-6988	*86-7017	*87-7061	87-7089	87-7092	*87-7100
		*87-7122	*87-7140	*87-7173	87-7201	87-7204	*87-7212	*87-7234	*87-7252	*87-7294
		87-7322	87-7325	*87-7333	*87-7355	*87-7373	*87-7406	87-7434	87-7437	*87-7445
		*87-7467	*87-7485	*87-7534	87-7545	*87-7587	87-7599	*87-7641	87-7652	*87-7693
		88-7713	*88-7759	88-7781	*88-7829	88-7839	*88-7885	88-7896	*88-7945	88-7964
		*88-8018	88-8033	88-8035	*88-8083	88-8097	*88-8142	88-8157	*88-8202	*88-8223
		*88-8239	*89-8373	*89-8381	*89-8392	89-8402	*89-8405	*89-8531	*89-8547	*89-8575
		*89-8591	*90-8842							
CMRPAT	002054	#70-627	*77-1993	77-1995	77-2008	*77-2017	77-2018	*77-2102	77-2107	*77-2158
		*77-2219	77-2231	*77-2271						
CMR119	047342	*86-6818	*86-6821	*86-6822	86-6840	*86-6852	*86-6855	*86-6856	86-6870	*86-6956
		*86-6959	*86-6960	86-6978	*86-6990	*86-6993	*86-6994	86-7008	90-8958	90-8979
		#90-8999								
CM1	= 100000	#71-748								
CM1513	047326	*80-3330	*80-3334	80-3335	*80-3341	*80-3342	80-3350	*80-3409	*80-3416	*80-3417
		80-3420	80-3436	90-8946	90-8973	#90-8993				
CM2	= 040000	#71-747								
CM3	= 020000	#71-746								
CNT121	047330	*81-3909	*81-3911	81-3918	*81-3977	*81-3979	81-3986	*81-4338	*81-4340	81-4347
		*81-4404	*81-4406	81-4413	90-8948	90-8974	#90-8994			
CR	= 000015	90-8740	90-8740							
CRLF	= 000200	69-595	69-596	69-597	69-598	69-614	79-2846	79-2847	89-8367	89-8367
		89-8369	89-8369	89-8720	90-8740	90-8740	90-8771	90-8771	90-8786	
DAT	045416	90-8774	#90-8786							
DCPI	= 000001	#71-724	86-6525							
DISPRE	000174	#68-557								
EHA	= 000004	#71-738								
ENDPAS	044034	#89-8709								
ERROR	= 104000	74-887	74-913	74-939	74-965	74-991	74-1013	74-1034	74-1059	74-1082
		74-1103	74-1122	74-1145	74-1165	74-1184	74-1205	74-1226	75-1264	75-1281
		75-1307	75-1329	75-1349	75-1369	75-1389	75-1407	75-1427	75-1455	75-1466
		75-1477	75-1488	75-1499	75-1510	75-1521	75-1532	75-1543	75-1554	75-1565
		75-1576	75-1603	75-1624	75-1656	75-1676	75-1696	75-1716	75-1738	75-1761
		75-1790	75-1801	75-1812	75-1862	77-1921	77-1971	77-2010	77-2067	77-2147
		77-2195	77-2263	77-2322	77-2362	77-2403	77-2453	77-2504	77-2554	79-2607

SYMBOL	VALUE	REFERENCES
		79-2665 79-2731 79-2823 79-2912 79-2966 79-3001 79-3038 79-3081 79-3124
		79-3169 79-3214 80-3275 80-3345 80-3430 80-3482 80-3505 80-3534 80-3562
		80-3618 80-3668 80-3725 80-3775 80-3834 81-3912 81-3980 81-4049 81-4099
		81-4156 81-4206 81-4265 81-4341 81-4407 81-4474 81-4486 82-4540 82-4590
		82-4656 82-4664 82-4673 82-4681 82-4727 82-4800 82-4826 82-4907 82-4933
		83-5029 83-5063 83-5154 83-5188 83-5263 83-5272 83-5321 83-5332 83-5388
		83-5400 83-5453 83-5463 83-5519 83-5572 84-5626 84-5681 84-5693 84-5703
		84-5764 84-5775 84-5785 84-5849 84-5861 84-5871 84-5932 84-5943 84-5953
		84-6033 84-6053 84-6122 84-6176 84-6235 85-6325 85-6337 85-6349 85-6443
		85-6455 85-6467 86-6549 86-6616 86-6705 86-6713 86-6721 86-6728 86-6828
		86-6861 86-6966 86-6999 87-7103 87-7125 87-7215 87-7237 87-7336 87-7358
		87-7448 87-7470 87-7551 87-7605 87-7658 88-7723 88-7791 88-7845 88-7902
		88-7970 88-8046 88-8103 88-8163 88-8246 88-8257 88-8300 89-8412 89-8496
		89-8505 89-8554 89-8598 89-8645 89-8690 #90-8747
ERRPC	045250	#90-8748 *90-8769 90-8789
ESA	= 000020	#71-740
EXDAT1	047324	*80-3339 80-3349 *80-3429 80-3435 *86-6817 86-6839 *86-6851 86-6869 *86-6955
		86-6977 *86-6989 86-7007 90-8944 90-8972 #90-8992
EXDAT3	047336	*82-4539 82-4547 *82-4589 82-4594 *83-5018 83-5040 *83-5052 83-5071 *83-5143
		83-5165 *83-5177 83-5196 90-8954 90-8977 #90-8997
EXDAT6	047320	*79-3037 79-3042 *81-4472 81-4479 *81-4484 81-4491 *82-4795 82-4811 *82-4821
		82-4834 *82-4902 82-4918 *82-4928 83-4942 *84-6232 84-6238 *85-6323 85-6329
		*85-6335 85-6341 *85-6347 85-6353 *85-6441 85-6447 *85-6453 85-6459 *85-6465
		85-6471 *88-8299 88-8306 *89-8643 89-8647 90-8940 90-8970 #90-8990
FAILAD	047344	*89-8642 89-8646 90-8960 90-8980 #90-9000
FAIL1	002060	#70-629 *80-3472 *80-3476 80-3480 *86-6515 *86-6533 86-6547 *86-6583 *86-6603
		86-6614 *86-6660 *86-6685 86-6726 *88-8196 *88-8235 88-8244
FAIL2	002062	#70-630 *88-8197 *88-8237 88-8254
FC	= 000400	#71-729 80-3473 80-3499 80-3524 80-3527 80-3552 80-3555 80-3587 80-3643
		80-3694 80-3750 80-3799 81-3876 81-3890 81-3894 81-3944 81-3958 81-3962
		81-4018 81-4074 81-4125 81-4181 81-4230 81-4306 81-4320 81-4324 81-4371
		81-4385 81-4389 82-4624 82-4700 83-5446 84-5621 84-6203 85-6280 85-6316
		85-6395 85-6434 86-6504 86-6543 86-6572 86-6610 86-6648 86-6699 87-7053
		87-7165 87-7286 87-7398 88-7716 88-7784 88-8339 89-8441
FIN	045570	90-8795 90-8813 #90-8818
FLTPAT	047332	*77-2033 77-2044 77-2047 77-2062 77-2065 *77-2073 77-2074 *77-2094 77-2106
		77-2140 77-2141 *77-2154 77-2155 *79-2776 79-2788 *79-2832 *79-2884 79-2887
		79-2888 79-2910 *79-2922 79-2923 *79-3019 79-3020 79-3035 79-3037 *79-3046
		*80-3246 80-3249 80-3250 80-3273 *80-3285 80-3286 *80-3802 80-3805 80-3806
		80-3832 *80-3847 80-3848 *81-4233 81-4236 81-4237 81-4263 *81-4278 81-4279
		*83-5301 83-5302 83-5326 83-5337 *83-5341 83-5342 *83-5367 83-5368 83-5393
		83-5405 *83-5409 *83-5550 83-5551 83-5577 *83-5581 83-5582 *84-6001 84-6004
		84-6005 84-6031 84-6051 *84-6067 84-6068 *84-6093 84-6096 84-6097 84-6120
		*84-6136 84-6137 *88-8278 88-8279 88-8295 88-8299 *88-8311 90-8950 90-8975
		#90-8995
FMHI	= 000010	#71-726 74-1161
FMLO	= 000004	#71-725 74-1118 86-6525 86-6593 86-6671 88-7705 88-7771
GNS	= ******	68-557 68-557 69-595 69-596 69-597 69-598 69-614 79-2846 79-2847
		89-8367 89-8368 89-8369 89-8720 90-8743 90-8743 90-8743 90-8743 90-8743
		90-8743 90-8743 90-8743 90-8743 90-8743 90-8771 90-8786 90-8788 90-8801
		90-8804 90-8872 90-8874 90-8876 90-8878 90-8880 90-8882 90-8884 90-8886
		90-8888 90-8890 90-8892 90-8894 90-8896 90-8898 90-8900 90-8902 90-8904

SYMBOL	VALUE	REFERENCES								
HIGH1	070000	72-834	#90-9010							
HIT	= 000400	#71-741	87-7548	87-7602	87-7655	88-7720	88-7788	88-7842	88-7899	88-7967
		88-8043	88-8100	88-8160						
HODO	= 000002	#71-737	77-2299	77-2339	77-2382	77-2429	77-2480	77-2530	79-2583	79-2643
		79-2697	79-2792	79-2891	79-2950	79-2985	79-3021	79-3066	79-3109	79-3154
		79-3199	80-3253	80-3319	80-3392	80-3596	80-3649	80-3703	80-3756	80-3807
		81-3880	81-3948	81-4027	81-4080	81-4134	81-4187	81-4238	81-4310	81-4375
		81-4447	81-4511	82-4561	82-4628	82-4707	82-4768	82-4875	83-4987	83-5112
		83-5246	83-5303	83-5369	83-5430	83-5499	83-5553	84-5603	84-5661	84-5744
		84-5829	84-5912	84-6008	84-6098	84-6164	84-6207	85-6284	85-6400	86-6511
		86-6579	86-6656	86-6771	86-6909	87-7061	87-7173	87-7294	87-7406	87-7534
		87-7587	87-7641	87-7693	88-7759	88-7829	88-7885	88-7945	88-8018	88-8083
		88-8142	88-8202	88-8223	89-8373	89-8381	89-8392	89-8531	89-8575	
HPB	= 004000	#71-744	83-5261	83-5319	83-5385	83-5450	84-5679	84-5762	84-5847	84-5930
		84-6027	84-6047							
HT	= 000011	90-8740	90-8740							
INHERR	045556	90-8766	#90-8810							
KPAR0	= 172340	#71-692	*75-1881							
KPAR1	= 172342	#71-693	*75-1882							
KPAR2	= 172344	#71-694	*75-1883							
KPAR3	= 172346	#71-695	*75-1884							
KPAR4	= 172350	#71-696	*77-2036	*77-2090	*77-2222	77-2253	77-2254	*77-2269	*79-2689	79-2719
		79-2723	*79-2741	*79-2774	79-2811	79-2815	*79-2831	*80-3382	80-3423	*80-3438
		*88-8010								
KPAR5	= 172352	#71-697								
KPAR6	= 172354	#71-698								
KPAR7	= 172356	#71-699	*75-1885							
KPDR0	= 172300	#71-684	*75-1873							
KPDR1	= 172302	#71-685	*75-1874							
KPDR2	= 172304	#71-686	*75-1875							
KPDR3	= 172306	#71-687	*75-1876							
KPDR4	= 172310	#71-688	*75-1877							
KPDR5	= 172312	#71-689	*75-1878							
KPDR6	= 172314	#71-690	*75-1879							
KPDR7	= 172316	#71-691	*75-1880							
LF	= 000012	90-8740	90-8740							
LOOP	002052	#70-626	*73-858	*73-859	*77-1966	*77-1969	*77-2142	*77-2145	*77-2255	*77-2260
		*77-2317	*77-2320	*77-2357	*77-2360	*77-2396	*77-2399	*77-2448	*77-2451	*77-2499
		*77-2502	*77-2549	*77-2552	*79-2602	*79-2605	*79-2660	*79-2663	*79-2724	*79-2729
		*79-2816	*79-2821	*80-3340	*80-3343	*80-3415	*80-3418	*80-3424	*80-3427	*82-4534
		*82-4537	*82-4584	*82-4587	*83-5021	*83-5024	*83-5055	*83-5058	*83-5146	*83-5149
		*83-5180	*83-5183	*86-6820	*86-6823	*86-6854	*86-6857	*86-6958	*86-6961	*86-6992
		*86-6995	*89-8479	*89-8480						
LOW1	060000	72-824	#90-9008							
LPB	= 002000	#71-743	83-5270	83-5330	83-5397	83-5460	84-5690	84-5773	84-5858	84-5941
MAGPRE	006774	#75-1873								
OFF	= 001015	69-589	#71-758	73-850	74-1076	74-1096	74-1100	74-1138	74-1142	74-1223
		77-1941	77-1992	77-2032	77-2089	77-2174	77-2218	77-2297	77-2313	77-2337
		77-2353	77-2377	77-2395	77-2424	77-2442	77-2475	77-2493	77-2525	77-2543
		79-2578	79-2596	79-2642	79-2656	79-2688	79-2716	79-2763	79-2808	79-2883
		79-2906	79-2948	79-2963	79-2983	79-2998	79-3018	79-3034	79-3059	79-3076
		79-3102	79-3119	79-3147	79-3164	79-3192	79-3209	80-3241	80-3269	80-3318

SYMBOL	VALUE	REFERENCES								
		80-3333	80-3381	80-3413	80-3447	80-3584	80-3611	80-3640	80-3661	80-3691
		80-3718	80-3747	80-3768	80-3796	80-3827	80-3870	81-3907	81-3939	81-3975
		81-4015	81-4042	81-4071	81-4092	81-4122	81-4149	81-4178	81-4199	81-4227
		81-4258	81-4301	81-4337	81-4366	81-4402	81-4442	81-4468	81-4509	82-4528
		82-4560	82-4580	82-4621	82-4647	82-4697	82-4722	82-4759	82-4793	82-4819
		82-4843	82-4866	82-4900	82-4926	83-4951	83-4981	83-5016	83-5050	83-5081
		83-5106	83-5141	83-5175	83-5206	83-5244	83-5260	83-5300	83-5318	83-5366
		83-5384	83-5428	83-5444	83-5497	83-5515	83-5549	83-5569	84-5601	84-5619
		84-5653	84-5676	84-5736	84-5759	84-5819	84-5844	84-5904	84-5927	84-5995
		84-6026	84-6092	84-6116	84-6163	84-6202	84-6226	85-6279	85-6313	85-6394
		85-6431	86-6503	86-6534	86-6536	86-6571	86-6600	86-6602	86-6647	86-6686
		86-6688	86-6762	86-6815	86-6849	86-6878	86-6900	86-6953	86-6987	86-7016
		87-7050	87-7099	87-7121	87-7139	87-7162	87-7211	87-7233	87-7251	87-7283
		87-7332	87-7354	87-7372	87-7395	87-7444	87-7466	87-7484	87-7532	87-7547
		87-7585	87-7601	87-7639	87-7654	87-7691	88-7714	88-7756	88-7782	88-7827
		88-7841	88-7883	88-7897	88-7941	88-7966	88-8007	88-8040	88-8082	88-8099
		88-8141	88-8159	88-8191	88-8240	88-8275	88-8294	88-8336	89-8404	89-8438
		89-8492	89-8528	89-8546	89-8572	89-8590	89-8641			
PEA	= 000200	#71-728	84-6220	85-6303	85-6421	86-6672				
PEHI	= 000200	#71-753								
PELO	= 000100	#71-752								
PRDATA	046714	90-8797	#90-8909							
PRTABL	047236	90-8775	90-8796	#90-8964						
PRTITL	045742	90-8776	#90-8855							
PSW	= 177776	#71-657	*72-783	*73-849	*88-8201	*89-8484				
RECDAT	047334	*84-6175	84-6179	*84-6233	84-6239	*85-6324	85-6330	*85-6336	85-6342	*85-6348
		85-6354	*85-6442	85-6448	*85-6454	85-6460	*85-6466	85-6472	*88-8256	88-8262
		*88-8298	88-8308	*89-8644	89-8648	90-8952	90-8976	#90-8996		
RELCTH	002352	#72-834	74-1096	77-2297	77-2337	77-2377	77-2424	77-2475	79-2642	79-2688
		79-2763	79-2883	79-2948	79-2983	79-3018	79-3059	79-3102	80-3241	80-3318
		80-3381	80-3584	80-3640	80-3796	80-3870	81-4015	81-4071	81-4227	81-4301
		81-4442	81-4509	82-4621	82-4697	82-4759	83-4981	83-5244	83-5300	83-5366
		83-5428	83-5497	83-5549	84-5601	84-5653	84-5819	84-5995	84-6092	84-6163
		84-6202	85-6279	85-6394	86-6503	86-6571	86-6647	86-6762	87-7050	87-7283
		87-7532	87-7639	87-7691	88-7756	88-7883	88-7941	88-8007	88-8082	88-8141
		88-8191	88-8275	88-8336	89-8438	89-8528	89-8572			
RELCTL	002324	#72-824	74-1138	77-1941	77-1992	77-2032	77-2089	77-2174	77-2218	77-2525
		79-2578	79-3147	79-3192	80-3691	80-3747	81-3939	81-4122	81-4178	81-4366
		82-4560	82-4866	83-5106	84-5736	84-5904	86-6900	87-7162	87-7395	87-7585
		88-7827								
SAVR0	045304	*90-8750	#90-8757	90-8847						
SAVR1	045306	*90-8751	#90-8758	90-8848						
SAVR2	045310	*90-8752	#90-8759	90-8849						
SAVR3	045312	*90-8753	#90-8760	90-8850						
SAVR4	045314	*90-8754	#90-8761	90-8851						
SAVR5	045316	*90-8755	#90-8762	90-8852						
SCPCND	= 000004	#71-757	74-876	74-902	74-928	74-954	74-980	74-1008	74-1030	74-1055
		74-1075	74-1096	74-1117	74-1138	74-1160	74-1179	74-1200	74-1219	75-1241
		75-1259	75-1276	75-1302	75-1324	75-1344	75-1364	75-1384	75-1402	75-1422
		75-1450	75-1461	75-1472	75-1483	75-1494	75-1505	75-1516	75-1527	75-1538
		75-1549	75-1560	75-1571	75-1597	75-1618	75-1649	75-1669	75-1689	75-1709
		75-1729	75-1751	75-1785	75-1796	75-1807	75-1840	77-1912	77-1941	77-1992

SYMBOL CROSS REFERENCE

CREF

SYMBOL	VALUE	REFERENCES								
		77-2032	77-2089	77-2174	77-2218	77-2297	77-2337	77-2377	77-2424	77-2475
		77-2525	79-2578	79-2642	79-2688	79-2763	79-2883	79-2948	79-2983	79-3018
		79-3059	79-3102	79-3147	79-3192	80-3241	80-3318	80-3381	80-3470	80-3497
		80-3521	80-3549	80-3584	80-3640	80-3691	80-3747	80-3796	80-3870	81-3939
		81-4015	81-4071	81-4122	81-4178	81-4227	81-4301	81-4366	81-4442	81-4509
		82-4560	82-4621	82-4697	82-4759	82-4866	83-4981	83-5106	83-5244	83-5300
		83-5366	83-5428	83-5497	83-5549	84-5601	84-5653	84-5736	84-5819	84-5904
		84-5995	84-6092	84-6163	84-6202	85-6279	85-6394	86-6503	86-6571	86-6647
		86-6762	86-6900	87-7050	87-7162	87-7283	87-7395	87-7532	87-7585	87-7639
		87-7691	88-7756	88-7827	88-7883	88-7941	88-8007	88-8082	88-8141	88-8191
		88-8275	88-8336	89-8438	89-8528	89-8572	89-8626	89-8665	89-8700	
SR0	= 177572	#71-700	*77-2042	*77-2057	*77-2109	*77-2130	*77-2233	*77-2243	*79-2700	*79-2714
		*79-2779	*79-2806	*80-3396	*80-3411	*80-3444	*88-8015	*88-8038		
SR3	= 172516	#71-701	*77-2043	*77-2058	*77-2110	*77-2131	*77-2234	*77-2244	*79-2701	*79-2715
		*79-2780	*79-2807	*80-3397	*80-3412	*80-3445	*88-8016	*88-8039		
START	001000	69-581	#69-583							
STRTLP	002120	#72-773	*72-808	90-8840	90-8843					
STRTST	002116	#72-772	72-794	*72-807						
SWR	002064	*69-607	#70-633	72-786	72-790	72-798	82-4650	89-8711	90-8765	90-8827
		90-8830								
SWREG	000176	#68-557								
TDAR	= 000001	#71-736	77-2299	77-2339	77-2382	77-2429	77-2480	77-2530	79-2583	80-3596
		80-3703	80-3811	80-3816	81-4027	81-4134	81-4242	81-4247	81-4518	83-4987
		83-5112	83-5499	83-5553	84-5603	84-5661	84-5744	84-5829	84-5912	86-6771
		86-6787	86-6796	86-6909	86-6925	86-6934				
TITL	045320	90-8756	#90-8765							
TPB	= 001000	#71-742	83-5516	83-5570	84-5624	84-5701	84-5783	84-5869	84-5951	84-6117
TPE	= 000040	#71-751								
TSTCNT	002130	#72-777	*72-800	72-801	*72-805					
TSTID	= 000230	#71-756	74-870	74-870	#74-870	74-896	74-896	#74-896	74-922	74-922
		#74-922	74-948	74-948	#74-948	74-974	74-974	#74-974	74-1000	74-1000
		#74-1000	74-1022	74-1022	#74-1022	74-1049	74-1049	#74-1049	74-1069	74-1069
		#74-1069	74-1090	74-1090	#74-1090	74-1111	74-1111	#74-1111	74-1132	74-1132
		#74-1132	74-1154	74-1154	#74-1154	74-1173	74-1173	#74-1173	74-1194	74-1194
		#74-1194	74-1213	74-1213	#74-1213	75-1235	75-1235	#75-1235	75-1253	75-1253
		#75-1253	75-1271	75-1271	#75-1271	75-1296	75-1296	#75-1296	75-1317	75-1317
		#75-1317	75-1338	75-1338	#75-1338	75-1358	75-1358	#75-1358	75-1378	75-1378
		#75-1378	75-1396	75-1396	#75-1396	75-1416	75-1416	#75-1416	75-1443	75-1443
		#75-1443	75-1460	75-1460	#75-1460	75-1471	75-1471	#75-1471	75-1482	75-1482
		#75-1482	75-1493	75-1493	#75-1493	75-1504	75-1504	#75-1504	75-1515	75-1515
		#75-1515	75-1526	75-1526	#75-1526	75-1537	75-1537	#75-1537	75-1548	75-1548
		#75-1548	75-1559	75-1559	#75-1559	75-1570	75-1570	#75-1570	75-1590	75-1590
		#75-1590	75-1612	75-1612	#75-1612	75-1644	75-1644	#75-1644	75-1664	75-1664
		#75-1664	75-1684	75-1684	#75-1684	75-1704	75-1704	#75-1704	75-1724	75-1724
		#75-1724	75-1746	75-1746	#75-1746	75-1779	75-1779	#75-1779	75-1795	75-1795
		#75-1795	75-1806	75-1806	#75-1806	75-1832	75-1832	#75-1832	*76-1904	76-1904
		#76-1904	77-1930	77-1930	#77-1930	77-1985	77-1985	#77-1985	77-2024	77-2024
		#77-2024	77-2082	77-2082	#77-2082	77-2165	77-2165	#77-2165	77-2209	77-2209
		#77-2209	77-2291	77-2291	#77-2291	77-2331	77-2331	#77-2331	77-2371	77-2371
		#77-2371	77-2418	77-2418	#77-2418	77-2469	77-2469	#77-2469	77-2519	77-2519
		#77-2519	79-2572	79-2572	#79-2572	79-2634	79-2634	#79-2634	79-2680	79-2680
		#79-2680	79-2751	79-2751	#79-2751	79-2869	79-2869	#79-2869	79-2941	79-2941

SYMBOL	VALUE	REFERENCES								
		#79-2941	79-2976	79-2976	#79-2976	79-3011	79-3011	#79-3011	79-3051	79-3051
		#79-3051	79-3095	79-3095	#79-3095	79-3139	79-3139	#79-3139	79-3185	79-3185
		#79-3185	80-3230	80-3230	#80-3230	80-3306	80-3306	#80-3306	80-3357	80-3357
		#80-3357	80-3465	80-3465	#80-3465	80-3492	80-3492	#80-3492	80-3515	80-3515
		#80-3515	80-3543	80-3543	#80-3543	80-3578	80-3578	#80-3578	80-3634	80-3634
		#80-3634	80-3685	80-3685	#80-3685	80-3741	80-3741	#80-3741	80-3791	80-3791
		#80-3791	80-3863	80-3863	#80-3863	81-3931	81-3931	#81-3931	81-4009	81-4009
		#81-4009	81-4065	81-4065	#81-4065	81-4116	81-4116	#81-4116	81-4172	81-4172
		#81-4172	81-4222	81-4222	#81-4222	81-4294	81-4294	#81-4294	81-4359	81-4359
		#81-4359	81-4435	81-4435	#81-4435	81-4500	81-4500	#81-4500	82-4556	82-4556
		#82-4556	82-4604	82-4604	#82-4604	82-4694	82-4694	#82-4694	82-4743	82-4743
		#82-4743	82-4850	82-4850	#82-4850	83-4965	83-4965	#83-4965	83-5090	83-5090
		#83-5090	83-5225	83-5225	#83-5225	83-5281	83-5281	#83-5281	83-5347	83-5347
		#83-5347	83-5414	83-5414	#83-5414	83-5478	83-5478	#83-5478	83-5529	83-5529
		#83-5529	83-5587	83-5587	#83-5587	84-5637	84-5637	#84-5637	84-5720	84-5720
		#84-5720	84-5803	84-5803	#84-5803	84-5888	84-5888	#84-5888	84-5980	84-5980
		#84-5980	84-6077	84-6077	#84-6077	84-6157	84-6157	#84-6157	84-6187	84-6187
		#84-6187	85-6249	85-6249	#85-6249	85-6361	85-6361	#85-6361	86-6492	86-6492
		#86-6492	86-6560	86-6560	#86-6560	86-6628	86-6628	#86-6628	86-6746	86-6746
		#86-6746	86-6884	86-6884	#86-6884	86-7033	86-7033	#86-7033	87-7146	87-7146
		#87-7146	87-7267	87-7267	#87-7267	87-7379	87-7379	#87-7379	87-7508	87-7508
		#87-7508	87-7562	87-7562	#87-7562	87-7616	87-7616	#87-7616	87-7672	87-7672
		#87-7672	88-7736	88-7736	#88-7736	88-7804	88-7804	#88-7804	88-7860	88-7860
		#88-7860	88-7913	88-7913	#88-7913	88-7983	88-7983	#88-7983	88-8058	88-8058
		#88-8058	88-8116	88-8116	#88-8116	88-8184	88-8184	#88-8184	88-8270	88-8270
		#88-8270	88-8330	88-8330	#88-8330	89-8432	89-8432	#89-8432	89-8522	89-8522
		#89-8522	89-8566	89-8566	#89-8566	89-8618	89-8618	#89-8618	89-8658	89-8658
		#89-8658	89-8699	89-8699	#89-8699					
TSTIMS	002132	#72-778	72-801							
TYPDS	= 104405	89-8721	#90-8743							
TYPE	= 104401	69-595	69-596	69-597	69-598	69-614	79-2846	79-2847	89-8367	89-8368
		89-8369	89-8720	89-8722	90-8740	90-8741	90-8742	#90-8743	90-8771	90-8786
		90-8788	90-8790	90-8801	90-8803	90-8804	90-8872	90-8874	90-8876	90-8878
		90-8880	90-8882	90-8884	90-8886	90-8888	90-8890	90-8892	90-8894	90-8896
		90-8898	90-8900	90-8902	90-8904					
TYPOC	= 104402	#90-8743	90-8789	90-8938	90-8940	90-8950	90-8952	90-8960		
TYPON	= 104404	#90-8743								
TYPOS	= 104403	#90-8743	90-8787	90-8926	90-8927	90-8929	90-8930	90-8932	90-8934	90-8936
		90-8942	90-8944	90-8946	90-8948	90-8954	90-8956	90-8958		
T1	002476	#74-870								
T10	003264	#74-1049								
T100	012632	#79-2572								
T101	013056	#79-2634								
T102	013240	#79-2680								
T103	013556	#79-2751								
T104	014334	#79-2869								
T105	014546	#79-2941								
T106	014700	#79-2976								
T107	015036	#79-3011								
T11	003326	#74-1069								
T110	015222	#79-3051								
T111	015420	#79-3095								

SYMBOL	VALUE	REFERENCES
T112	015620	#79-3139
T113	016016	#79-3185
T114	016216	#80-3230
T115	016440	#80-3306
T116	016634	#80-3357
T117	017230	#80-3465
T12	003406	#74-1090
T120	017324	#80-3492
T121	017402	#80-3515
T122	017510	#80-3543
T123	017616	#80-3578
T124	020034	#80-3634
T125	020236	#80-3685
T126	020454	#80-3741
T127	020656	#80-3791
T13	003502	#74-1111
T130	021124	#80-3863
T131	021402	#81-3931
T132	021660	#81-4009
T133	022076	#81-4065
T134	022300	#81-4116
T135	022516	#81-4172
T136	022720	#81-4222
T137	023166	#81-4294
T14	003552	#74-1132
T140	023444	#81-4359
T141	023722	#81-4435
T142	024146	#81-4500
T143	024356	#82-4556
T144	024556	#82-4604
T145	025030	#82-4694
T146	025212	#82-4743
T147	025532	#82-4850
T15	003646	#74-1154
T150	026052	#83-4965
T151	026446	#83-5090
T152	027042	#83-5225
T153	027204	#83-5281
T154	027376	#83-5347
T155	027562	#83-5414
T156	027742	#83-5478
T157	030070	#83-5529
T16	003716	#74-1173
T160	030244	#83-5587
T161	030410	#84-5637
T162	030640	#84-5720
T163	031070	#84-5803
T164	031324	#84-5888
T165	031560	#84-5980
T166	032034	#84-6077
T167	032240	#84-6157
T17	003766	#74-1194

SYMBOL	VALUE	REFERENCES
T170	032342	#84-6187
T171	032542	#85-6249
T172	033100	#85-6361
T173	033436	#86-6492
T174	033726	#86-6560
T175	034216	#86-6628
T176	034574	#86-6746
T177	035226	#86-6884
T2	002572	#74-896
T20	004036	#74-1213
T200	035660	#86-7033
T201	036214	#87-7146
T202	036550	#87-7267
T203	037104	#87-7379
T204	037440	#87-7508
T205	037562	#87-7562
T206	037704	#87-7616
T207	040026	#87-7672
T21	004116	#75-1235
T210	040212	#88-7736
T211	040376	#88-7804
T212	040520	#88-7860
T213	040650	#88-7913
T214	041016	#88-7983
T215	041230	#88-8058
T216	041346	#88-8116
T217	041464	#88-8184
T22	004162	#75-1253
T220	041746	#88-8270
T221	042114	#88-8330
T222	042644	#89-8432
T223	043240	#89-8522
T224	043404	#89-8566
T225	043552	#89-8618
T226	043706	#89-8658
T227	044010	#89-8699
T23	004232	#75-1271
T24	004302	#75-1296
T25	004352	#75-1317
T26	004422	#75-1338
T27	004472	#75-1358
T3	002666	#74-922
T30	004542	#75-1378
T31	004612	#75-1396
T32	004662	#75-1416
T33	004732	#75-1443
T34	005002	#75-1460
T35	005052	#75-1471
T36	005122	#75-1482
T37	005172	#75-1493
T4	002762	#74-948
T40	005242	#75-1504

SYMBOL	VALUE	REFERENCES
T41	005312	#75-1515
T42	005362	#75-1526
T43	005432	#75-1537
T44	005502	#75-1548
T45	005552	#75-1559
T46	005622	#75-1570
T47	005672	#75-1590
T5	003056	#74-974
T50	005750	#75-1612
T51	006026	#75-1644
T52	006104	#75-1664
T53	006162	#75-1684
T54	006240	#75-1704
T55	006316	#75-1724
T56	006406	#75-1746
T57	006504	#75-1779
T6	003152	#74-1000
T60	006554	#75-1795
T61	006624	#75-1806
T62	006674	#75-1832
T63	007172	#76-1904
T64	007260	#77-1930
T65	007456	#77-1985
T66	007636	#77-2024
T67	010102	#77-2082
T7	003222	#74-1022
T70	010460	#77-2165
T71	010626	#77-2209
T72	011156	#77-2291
T73	011344	#77-2331
T74	011536	#77-2371
T75	011746	#77-2418
T76	012166	#77-2469
T77	012412	#77-2519
UCB =	001000	#71-730 75-1260 82-4636 82-4715 87-7074 87-7079 87-7186 87-7191 87-7307 87-7312 87-7419 87-7424 88-7893 88-7954 88-7958
UMPR00 =	170200	#71-702 *76-1891
UMPR01 =	170202	#71-703 *76-1892
UMPR02 =	170204	#71-704 *76-1893
UMPR03 =	170206	#71-705 *76-1894
UMPR04 =	170210	#71-706 *76-1895
UMPR05 =	170212	#71-707 *76-1896
UMPR06 =	170214	#71-708 *76-1897
UMPR07 =	170216	#71-709 *76-1898
UMPR08 =	170220	#71-710 *77-2095 *77-2157
UMPR09 =	170222	#71-711 *77-2106
VCIP =	010000	#71-732 80-3474 80-3500 80-3525 80-3528 80-3553 80-3556 80-3588 80-3644 80-3695 80-3751 80-3800 81-3877 81-3892 81-3895 81-3945 81-3960 81-3963 81-4019 81-4075 81-4126 81-4182 81-4231 81-4307 81-4322 81-4325 81-4372 81-4387 81-4390 82-4625 82-4701 83-5448 84-5622 84-6204 85-6281 85-6318 85-6396 85-6436 86-6505 86-6545 86-6573 86-6612 86-6649 86-6701 87-7054 87-7166 87-7287 87-7399 88-7718 88-7786 88-8340 89-8442

SYMBOL	VALUE	REFERENCES								
VLD	= 010000	#71-745	80-3612	80-3662	80-3719	80-3769	80-3828	81-3904	81-3972	81-4043
		81-4093	81-4150	81-4200	91-4259	81-4334	81-4399	82-4654	82-4662	82-4671
		82-4679	82-4725	89-8406						
VSIU	= 020000	#71-733	80-3522	80-3531	80-3550	80-3559	80-3585	80-3641	80-3692	80-3748
		80-3797	81-3874	81-3942	81-4016	81-4072	81-4123	81-4179	81-4228	81-4304
		81-4369	82-4622	82-4698	87-7051	87-7163	87-7284	87-7396	88-8337	89-8439
WWPD	= 000100	#71-727	83-5434	85-6406	85-6412	86-6519	86-6523	86-6587	86-6591	86-6665
		86-6669	88-7765	88-7771						
WWPT	= 002000	#71-731	84-5609	85-6290	85-6295	87-7699	88-7705			
$APTHD	001444	70-618	#70-618							
$ASTAT	= ******	70-620	70-620							
$ATYC	001630	70-620	#70-620							
$ATY1	001604	#70-620								
$ATY3	001612	#70-620	90-8740							
$ATY4	001622	#70-620								
$BASE	001534	#70-619								
$BELL	002102	#70-642								
$CDW1	001540	#70-619								
$CDW2	001542	#70-619								
$CHARC	044522	*90-8740	*90-8740	90-8740	*90-8740	#90-8740				
$CKSWR	= ******	90-8743								
$CPUOP	001506	#70-619								
$CRLF	002107	#70-644	90-8740	90-8740	90-8740					
$DBLK	045170	90-8742	90-8742	#90-8742						
$DDW0	001544	#70-619								
$DDW1	001546	#70-619								
$DDW10	001570	#70-619								
$DDW11	001572	#70-619								
$DDW12	001574	#70-619								
$DDW13	001576	#70-619								
$DDW14	001600	#70-619								
$DDW15	001602	#70-619								
$DDW2	001550	#70-619								
$DDW3	001552	#70-619								
$DDW4	001554	#70-619								
$DDW5	001556	#70-619								
$DDW6	001560	#70-619								
$DDW7	001562	#70-619								
$DDW8	001564	#70-619								
$DDW9	001566	#70-619								
$DEVCT	001470	#70-619								
$DEVM	001536	#70-619								
$DOAGN	044164	89-8716	89-8724	#89-8730						
$DTBL	045160	90-8742	#90-8742							
$ENDAD	044154	68-576	#89-8726							
$ENULL	002112	#70-646	89-8722	90-8790	90-8803					
$ENV	001500	#70-619	70-620	70-620	90-8740	90-8823				
$ENVM	001501	69-605	#70-619	70-620	79-2764	88-8345	89-8447	90-8740	90-8740	
$ERROR	045252	68-569	#90-8750							
$ETABL	001500	#70-619								
$ETEND	001604	70-618	#70-619							
$FATAL	001462	#70-619	*70-620							

SYMBOL CROSS REFERENCE

SYMBOL		VALUE	REFERENCES								
$FFLG		002050	*70-620	*70-620	70-620	*70-620	#70-620				
$FILLC		002100	#70-640	90-8740	90-8740	90-8740					
$FILLS		002077	#70-639	90-8740	90-8740						
$GTSWR	=	******	90-8743								
$HD	=	000003	68-555	68-555	68-555						
$HIBTS		001444	#70-618								
$ICNT		044172	*89-8714	89-8715	*89-8717	#89-8733					
$LF		002110	#70-645	90-8740	90-8740						
$LFLG		002047	*70-620	#70-620							
$MADR1		001512	#70-619								
$MADR2		001516	#70-619								
$MADR3		001522	#70-619								
$MADR4		001526	#70-619								
$MAIL		001460	70-618	70-618	#70-619	90-8740					
$MAMS1		001510	#70-619								
$MAMS2		001514	#70-619								
$MAMS3		001520	#70-619								
$MAMS4		001524	#70-619								
$MBADR		001446	#70-618								
$MFLG		002046	*70-620	70-620	*70-620	#70-620					
$MSGAD		001474	#70-619	*70-620	70-620						
$MSGLG		001476	#70-619	*70-620							
$MSGTY		001460	#70-619	70-620	*70-620	70-620	*70-620				
$MTYP1		001511	#70-619								
$MTYP2		001515	#70-619								
$MTYP3		001521	#70-619								
$MTYP4		001525	#70-619								
$NULL		002076	#70-638	90-8740	90-8740	90-8740					
$OCNT		044750	*90-8741	*90-8741	#90-8741						
$OMODE		044752	*90-8741	*90-8741	90-8741	*90-8741	*90-8741	#90-8741			
$PASS		001466	*69-604	#70-619	72-796	79-2842	89-8363	89-8709	*89-8718	*89-8719	89-8721
$PASTM		001452	#70-618								
$QUES		002106	#70-643	90-8740	90-8740						
$RDCHR	=	******	90-8743								
$RDDEC	=	******	90-8743								
$RDLIN	=	******	90-8743								
$RDOCT	=	******	90-8743								
$R2A	=	******	90-8743								
$SAVRE	=	******	90-8743								
$SCPSE		002134	68-566	#72-782							
$SWR	=	160000	68-555	#68-555							
$SWREG		001502	69-607	#70-619							
$TESTN		001464	#70-619	72-784	72-788	*72-793	*73-851	*74-870	*74-896	*74-922	*74-948
			*74-974	*74-1000	*74-1022	*74-1049	*74-1069	*74-1090	*74-1111	*74-1132	*74-1154
			*74-1173	*74-1194	*74-1213	*75-1235	*75-1253	*75-1271	*75-1296	*75-1317	*75-1338
			*75-1358	*75-1378	*75-1396	*75-1416	*75-1443	*75-1460	*75-1471	*75-1482	*75-1493
			*75-1504	*75-1515	*75-1526	*75-1537	*75-1548	*75-1559	*75-1570	*75-1590	*75-1612
			*75-1644	*75-1664	*75-1684	*75-1704	*75-1724	*75-1746	*75-1779	*75-1795	*75-1806
			*75-1832	*76-1904	*77-1930	*77-1985	*77-2024	*77-2082	*77-2165	*77-2209	*77-2291
			*77-2331	*77-2371	*77-2418	*77-2469	*77-2519	*79-2572	*79-2634	*79-2680	*79-2751
			*79-2869	*79-2941	*79-2976	*79-3011	*79-3051	*79-3095	*79-3139	*79-3185	*80-3230
			*80-3306	*80-3357	*80-3465	*80-3492	*80-3515	*80-3543	*80-3578	*80-3634	*80-3685

SYMBOL		VALUE	REFERENCES								
			*80-3741	*80-3791	*80-3863	*81-3931	*81-4009	*81-4065	*81-4116	*81-4172	*81-4222
			*81-4294	*81-4359	*81-4435	*81-4500	*82-4556	*82-4604	*82-4694	*82-4743	*82-4850
			*83-4965	*83-5090	*83-5225	*83-5281	*83-5347	*83-5414	*83-5478	*83-5529	*83-5587
			*84-5637	*84-5720	*84-5803	*84-5888	*84-5980	*84-6077	*84-6157	*84-6187	*85-6249
			*85-6361	*86-6492	*86-6560	*86-6628	*86-6746	*86-6884	*86-7033	*87-7146	*87-7267
			*87-7379	*87-7508	*87-7562	*87-7616	*87-7672	*88-7736	*88-7804	*88-7860	*88-7913
			*88-7983	*88-8058	*88-8116	*88-8184	*88-8270	*88-8330	*89-8432	*89-8522	*89-8566
			*89-8618	*89-8658	*89-8699	90-8787					
$TIMES		044170	89-8715	#89-8732							
$TKB		002070	#70-635	90-8740	90-8740						
$TKS		002066	#70-634	90-8740	90-8740						
$TN	=	000001	68-555	#68-555							
$TPB		002074	#70-637	90-8740	90-8740	90-8740					
$TPFLG		002101	#70-641	90-8740	90-8740	90-8740					
$TPS		002072	#70-636	90-8740	90-8740	90-8740					
$TRAP		045200	68-571	#90-8743							
$TRAP2		045222	#90-8743	90-8743							
$TRP	=	000006	#90-8743	90-8743	90-8743	90-8743	90-8743	#90-8743	90-8743	90-8743	90-8743
			90-8743	#90-8743	90-8743	90-8743	90-8743	90-8743	#90-8743	90-8743	90-8743
			90-8743	90-8743	#90-8743	90-8743	90-8743	90-8743	90-8743	#90-8743	
$TRPAD		045234	90-8743	#90-8743							
$TSTM		001450	#70-618								
$TYPBN	=	******	90-8743								
$TYPDS		044754	#90-8742	90-8743	90-8743						
$TYPE		044174	70-620	#90-8740	90-8743	90-8743					
$TYPEC		044406	90-8740	90-8740	90-8740	#90-8740	90-8740				
$TYPEX		044524	90-8740	90-8740	#90-8740						
$TYPOC		044552	#90-8741	90-8743	90-8743						
$TYPON		044566	90-8741	#90-8741	90-8743						
$TYPOS		044526	#90-8741	90-8743							
$UNIT		001472	#70-619								
$UNITM		001454	#70-618								
$USWR		001504	#70-619	79-2766	88-8347	89-8449					
$VECT1		001530	#70-619								
$VECT2		001532	#70-619								
$OFILL		044751	*90-8741	*90-8741	90-8741	#90-8741					
.$ASTA	=	******	70-620	70-620							
.$X	=	001444	#70-618	70-618							

MACRO CROSS REFERENCE

MACRO NAME	REFERENCES									
COMMEN	#18-1530									
ENDCOM	#18-1542									
EOTST	#67-473	75-1459	75-1470	75-1481	75-1492	75-1503	75-1514	75-1525	75-1536	75-1547
	75-1558	75-1569	75-1794	75-1805						
ERR	#67-478	74-887	74-913	74-939	74-965	74-991	74-1013	74-1034	74-1059	74-1082
	74-1103	74-1122	74-1145	74-1165	74-1184	74-1205	74-1226	75-1264	75-1281	75-1307
	75-1329	75-1349	75-1369	75-1389	75-1407	75-1427	75-1455	75-1466	75-1477	75-1488
	75-1499	75-1510	75-1521	75-1532	75-1543	75-1554	75-1565	75-1576	75-1603	75-1624
	75-1656	75-1676	75-1696	75-1716	75-1738	75-1761	75-1790	75-1801	75-1812	75-1862
	77-1921	77-1971	77-2010	77-2067	77-2147	77-2195	77-2263	77-2322	77-2362	77-2403
	77-2453	77-2504	77-2554	79-2607	79-2665	79-2731	79-2823	79-2912	79-2966	79-3001
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	87-7237	87-7336	87-7358	87-7448	87-7470	87-7551	87-7605	87-7658	88-7723	88-7791
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	75-1621	75-1652	75-1672	75-1692	75-1712	75-1734	75-1757	75-1787	75-1798	75-1809
	75-1859	77-1918	77-1958	77-2002	77-2059	77-2132	77-2187	77-2245	77-2311	77-2351
	77-2393	77-2440	77-2491	77-2541	79-2594	79-2654	79-2713	79-2805	79-2904	79-2961
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	89-8685	89-8702								
MULT	#43-4409									
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	#84-6202	#85-6279	#85-6394	#86-6503	#86-6571	#86-6647	#86-6762	#86-6900	#87-7050	#87-7162
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TYPNUM          #25-1980
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