KD11-Z 11/44 CPU/EIS AH-F620B-MC
CKKAABO FICHE 1 OF 2

digital

KD11-Z 11/44 CPU/EIS
CKKAABO
AH-F620B-MC
FICHE 2 OF 2

```
                .REM    %



                        I D E N T I F I C A T I O N
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                PRODUCT CODE:       AC-F618B-MC
                PRODUCT NAME:       CKKAAB0 11/44 CPU/EIS
                DATE CREATED:       APRIL, 1981
                MAINTAINER:         DIAGNOSTIC GROUP
                AUTHORS:            CHUCK ROBINSON, DAN MILLEVILLE
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                    **********************
                    *                    *
                    * HISTORY SECTION    *
                    *                    *
                    **********************

REVISION            RELEASE DATE          COMMENTS
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CKKAAA              OCTOBER, 1979         INITIAL RELEASE
CKKAAB              APRIL, 1981           ADDITION OF TEST 340 TO CHECK
                                          CPU POWER MONITOR BIT AND USE OF
                                          NEW SYSMAC TO CHECK FOR RANDOM
                                          ^Q BEFORE ^S IN INPUT ROUTINE
```

```
60
61                          ****************************************
62                          *                                      *
63                          * SUMMARY OF OPERATING INSTRUCTIONS    *
64                          *                                      *
65                          ****************************************
66
67
68
69          THE FOLLOWING PROCEDURE CAN BE USED TO RUN THIS DIAGNOSTIC
70          IN A STANDARD CONFIGURATION WITH AT LEAST 8K OF MEMORY
71          AND A TELETYPE. IF THE PROGRAM DOES NOT RUN SUCCESSFULLY
72          CONSULT THE FOLLOWING DOCUMENT FOR ASSISTANCE.
73
74          OPERATING PROCEDURES:
75
76                  1.  LOAD THE PROGRAM USING NORMAL PROCEDURES
77
78                  2.  START THE PROGRAM AT LOCATION 200
79
80                  3.  PROGRAM SHOULD PRINT ''END OF PASS'' WITHIN
81                      THE 1ST SECOND AND REPEATABLY THEREAFTER
82                      AT APPROX. 5 SEC. INTERVALS WITH CACHE ON.
83                     ( APPROX. 10 SEC INTERVALS WITH CACHE OFF)
84
85                  4.  IF THE PROGRAM DOES NOT RUN AS DESCRIBED ABOVE,
86                      CONSULT THE FULL OPERATING INSTRUCTIONS WHICH
87                      FOLLOW.
88
```

1.0 GENERAL PROGRAM INFORMATION

1.1 PROGRAM PURPOSE

THIS DIAGNOSTIC PROGRAM IS DESIGNED TO BE A COMPREHENSIVE CHECK OF THE PDP-11/44 BASIC INSTRUCTION SET. THE PROGRAM EXERCISES ALL OF THE PROCESSOR LOGIC AND MICROCODE FOR ALL INSTRUCTIONS EXCEPT THE TRAP AND MEMORY MANAGEMENT INSTRUCTIONS. THE PROGRAM DOES NOT TEST INSTRUCTIONS OR HARDWARE RELATED TO THE TRAP OR INTERRUPT MECHANISMS OF THE 11/44 (E.G. RTT, RT1, WAIT, RESET, TRAP, EMT).

NOTE: HOWEVER,IF THE OPTIONAL CPU/CIS TESTS ARE RUN THEN THE BREAKPOINT TRAP INSTRUCTION AND THE ABILITY TO TRAP UNDER ILLEGAL INSTRUCTION(TRAP TO 10) WILL BE ASSUMED TO BE FUNCTIONAL.(SEE SECT.2.3)

1.2 SYSTEM REQUIREMENTS

1.2.1 HARDWARE

PDP-11/44 PROCESSOR
16K MEMORY -- THE PROGRAM USES LOCATIONS 0 - 36000

1.2.2 SOFTWARE

THIS PROGRAM IS WRITTEN TO BE RUN AS A STAND-ALONE PROGRAM. HOWEVER, THE PROGRAM IS DESIGNED TO RUN UNDER AUTOMATED PRODUCT TEST SYSTEM (APT) IN ALL THREE MODES.

THE PROGRAM CAN ALSO BE RUN UNDER THE ACT 11 MONITOR

1.3 RELATED DOCUMENTS AND STANDARDS

PDP-11/44 MICROCODE LISTING

PDP-11/44 ELECTRICAL SCHEMATICS

1.4 DIAGNOSTIC HIERARCHY PREREQUISITES

NONE

1.5 FAILURE ASSUMPTIONS

NONE

2.0 OPERATING INSTRUCTIONS

2.1 LOADING AND STARTING PROCEDURES

2.1.1 LOADING

USE NORMAL PROCEDURES FOR LOADING ABSOLUTE BINARY TAPES.

2.1.2 NORMAL START

THIS IS THE PROCEDURE FOR NORMAL PROGRAM RUNNING (I.E., STARTING WITH TEST 1 AND EXECUTING ENTIRE DIAGNOSTIC).

START AT ADDRESS = 200

2.1.3 SUBTEST START

THIS IS THE PROCEDURE FOR STARTING AT A SUBTEST OTHER THAN 1.

1. LOAD $TESTN (IN MAILBOX SECTION) WITH THE NUMBER OF SUBTEST MINUS ONE (IN OCTAL). FOR EXAMPLE, TO START AT SUBTEST 100, $TESTN=77.

2. LOAD STARTING ADDRESS OF SUBTEST IN LOC. 216

3. START AT ADDRESS = 204

2.2 SPECIAL ENVIRONMENTS

THIS PROGRAM IS WRITTEN TO COMPLY WITH ALL THE REQUIREMENTS OF THE APT INTERFACE SPECIFICATION. IT WILL RUN UNDER APT IN EITHER QUICK VERIFY, PROGRAM OR RUN-TIME MODES.

THIS PROGRAM IS WRITTEN TO COMPLY WITH ALL OF THE REQUIREMENTS OF PROGRAMS TO RUN UNDER THE ACT11 MONITOR.

2.2.1 RUNNING UNDER APT

THE EXECUTION TIMES PROVIDED IN THE APT SCRIPT THAT FOLLOWS ARE FOR EXECUTION WITH A 11/44 PROCESSOR, CACHE, 16K CORE MEMORY, AND 300 BAUD.

THE FOLLOWING IS A PROGRAM LOAD FILE USED BY APT:

1. E TABLE 'A' IS USED FOR APT DUMP MODE.
   A. IN ADDITION TO NORMAL CPU DIAGNOSTIC TESTS THIS TABLE WILL SELECT THE OPTIONAL CACHE AND CIS TESTS.($SWREG=400)

2. E TABLE 'B' IS USED FOR APT QV MODE WHILE RUNNING ON A MANUFACTURING QV STATION.
   IT ACCOMPLISHES WHAT ETABLE 'A' DOES BUT ADDITIONALLY SUPRESSES TYPEOUTS.($ENVM=240)

3. ETABLE 'C' IS USED FOR APT QV OR RUNTIME MODES WHILE RUNNING ON SYSTEMS OTHER THAN MFG. QV STATIONS. THIS TABLE DESELECTS THE OPTIONAL CACHE AND CIS TESTS.

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

.....	E TABLES	.....	
	A	B	C
E-MODE/S-MODE ($ENVM/$ENV)	200/000	240/001	240/001
SWITCH REGISTER 1 ($SWREG)	000400	000400	000000
SWITCH REGISTER 2	000000	000000	000000
CPU TYPE/OPTIONS	00/0000	00/0000	00/0000

2.3 PROGRAM OPTIONS

THIS PROGRAM IS INTENDED TO BE A BASIC PROCESSOR TEST.
IT IS INTENDED TO BE THE LOWEST LEVEL DIAGNOSTIC RUN.
HOWEVER, IT DOES PROVIDE FOR OPTIONAL CACHE AND CIS TESTS.
THESE TESTS CAN BE SELECTED AND RUN IN MANUFACTURING ON
THE MFG. QV STATTION. THE TESTS ARE SPECIALLY DESIGNED
TO EXERCISE THOSE SIGNALS ON THE CPU DATA PATH/CONTROL
MODULES WHICH RELATE TO THE CACHE AND CIS. IT IS ASSUMED
THAT CACHE AND CIS MODULES ARE KNOWN GOOD. RUNNING THESETESTS
ELIMINATE HAVING TO RUN THE CACHE AND CIS DIAGNOSTICS IN
THE CPU APT QUICK VERIFY SCRIPT.

THE OPTIONAL TESTS ARE SELECTED THROUGH APT SCRIPTING OR
BY LOADING BIT08 OF HARDWARE SWITCH REGISTER(177570).
SEE SECTION 2.2.1.

2.4 EXECUTION TIMES

THE DIAGNOSTIC COMPLETES THE FIRST PASS IN LESS THAN 1 SEC.
SUBSEQUENT PRINTING OF END OF PASS MESSAGE REQUIRE APPROXIMATELY.
5 TO 10 SECS. INTERVALS
THE PROGRAM WILL RUN CONTINUOUSLY UNTIL EXTERNALLY HALTED.

3.0 ERROR INFORMATION

3.1 ERROR TYPES

THERE ARE TWO BASIC TYPES OF ERRORS IN THE DIAGNOSTIC.

3.1.1 FUNCTIONAL ERRORS

THESE ARE ERRORS WHICH REPRESENT A MALFUNCTION OF AN
INSTRUCTION OR SEQUENCE OF INSTRUCTION. (E.G., THE PROPER
CONDITION CODE NOT SET OR IMPROPER RESULT OF AN ARITHMETIC
OR LOGICAL OPERATION).

3.1.2 SEQUENCE ERRORS

THE RESULT OF A TEST BEING EXECUTED OUT OF SEQUENCE. (E.G.
WILD MACHINE OR IMPROPER BRANCH OR JUMP).

3.2 ERROR REPORTING PROCEDURES

THE DIAGNOSTIC RESPONDS TO THE DETECTION OF ALL ERRORS BY
STORING CERTAIN INFORMATION IN MEMORY AND HALTING THE PROCESSOR.
THE INFORMATION STORED IN MEMORY CAN BE USED BY THE OPERATOR

```
                                TO IDENTIFY THE ERROR DETECTED.

                                CERTAIN FAILURES WILL CAUSE THE PROCESSOR TO HANG.
                                THIS TYPE OF FAILURE IS INDICATED IF THE PROGRAM
                                DOES NOT PRINT ITS END OF PASS INDICATION WITHIN A REASONABLE
                                AMOUNT OF TIME. (FIRST MESSAGE SHOULD APPEAR WITHIN 1 SEC.)
```

3.3 ERROR DESCRIPTOR INFORMATION

THE DIAGNOSTIC MAILBOX HOLDS THE ERROR INFORMATION NECESSARY TO IDENTIFY THE DETECTED ERROR. THIS INFORMATION HAS BEEN DESIGNED FOR COMPLIANCE WITH THE APT DIAGNOSTIC INTERFACE SPECIFICATION. IT IS THE PRIMARY MEDIUM FOR IDENTIFYING ERRORS.

3.3.1 $MSGTYP

THIS LOCATION IS INCREMENTED FROM ZERO TO ONE BEFORE THE PROGRAM COMES TO A PROGRAMMED HALT. IF THIS LOCATION IS NOT ONE, THEN THE DIAGNOSTIC HAS COME TO AN UNPROGRAMMED HALT. CHECK THE STACK AND PC FOR A CLUE TO THE CAUSE. SUSPECT A TRAP.

3.3.2 $FATAL

THIS LOCATION IS LOADED WITH A NUMBER BEFORE A HALT IS EXECUTED. EACH PROGRAMMED HALT HAS A UNIQUE NUMBER ASSOCIATED WITH IT WHICH CAN BE USED TO IDENTIFY THE ERROR WHICH HAS BEEN DETECTED.

3.3.3 $PASS

THIS LOCATION IS INCREMENTED FOR EVERY COMPLETE PASS OF THE DIAGNOSTIC. MONITORING THE LOCATION WILL INDICATE WHETHER OR NOT THE PROGRAM IS HUNG. IT WILL ALSO INDICATE THE NUMBER OF SUCCESSFUL PASSES COMPLETED BEFORE THE ERROR HALT. A HIGH PASS COUNT MIGHT INDICATE THAT THE ERROR HALT IS ASSOCIATED WITH AN INTERMITTANT FAULT.

3.3.4 $TESTN

THIS LOCATION IS INCREMENTED IN EACH NEW SUBTEST. THIS SHOULD INDICATE THE TEST BEING EXECUTED WHEN THE ERROR WAS DETECTED. THIS LOCATION IS ALSO USED TO DETECT A SEQUENCE ERROR.

3.4 ERROR IDENTIFICATION

BECAUSE OF THE OVERHEAD ASSOCIATED WITH EACH HALT IN AN APT COMPATIBLE PROGRAM THE SEQUENCE CHECK CODE WILL SHARE THE ERROR HALT OF FUNCTIONAL ERROR WITHIN EACH SUBTEST.
TO DETERMINE WHICH ERROR IS BEING REPORTED, LOCATIONS $FATAL AND $TESTN ARE USED TOGETHER. WHEN AN ERROR HALT OCCURS, CHECK $FATAL TO DETERMINE THE NUMBER OF THE ERROR DETECTED. NOW, CHECK THAT THE TEST NUMBER WHERE THIS ERROR IS DETECTED CORRESPONDS TO THE VALUE IN $TESTN. IF THESE AGREE THE ERROR WAS A FUNCTIONAL ERROR AS DESCRIBED IN THE LISTINGS. IF THESE NUMBERS DO NOT AGREE, THEN A SEQUENCE ERROR WAS DETECTED. IN THIS CASE $TESTN WILL CONTAIN ONE MORE THAN THE NUMBER OF THE LAST TEST SUCCESSFULLY COMPLETED. SEQUENCE ERRORS WHICH SHARE THE ERROR HALTS OF FUNCTIONAL ERRORS WILL ALWAYS BE REPORTED BY THE LAST HALT IN SUBTEST IN WHICH THEY WERE DISCOVERED.

4.0 PROGRESS REPORT

THE MESSAGE CKKAAB0 11/44 CPU/EIS IS PRINTED ON THE CONSOLE TELETYPE AFTER THE FIRST PASS, AND FOLLOWING EVERY SUBSEQUENT 400 PASSES.

5.0 TROUBLE SHOOTING

WHEN THE PROGRAM DISCOVERS A FAULT IT WILL HALT. TO DETERMINE THE CAUSE OF THE HALT, THE DIAGNOSTIC PROVIDES ERROR INFORMATION. THIS INFORMATION IS STORED IN THE APT MAILBOX AND IS THE PRIMARY SOURCE OF ERROR IDENTIFICATION.

UPON FINDING AN ERROR, THE FOLLOWING PROCEDURE SHOULD AID IN ISOLATING THE FAULT.

5.1 CHECK THE MAILBOX

1. $MSGTY THIS LOCATION SHOULD CONTAIN A 1. IF THE PROCESSOR HALTS AND THIS LOCATION IS ZERO, THEN THE PROCESSOR HAS COME TO AN UNEXPECTED HALT. FIRST SUSPECT A TRAP. CHECK THE PC AND IF A TRAP CHECK R6 AND THE STACK FOR THE LOCATION OF THE FAILING INSTRUCTION.

2. $FATAL THIS LOCATION IS USED TO HOLD THE NUMBER OF THE ERROR WHICH DETECTED. EACH ERROR BEING CHECKED BY THE DIAGNOSTIC IS ASSIGNED A UNIQUE NUMBER WHICH IS STORED IN $FATAL WHEN THAT ERROR IS DETECTE

   WHEN AN ERROR IS DETECTED, CHECK THE LISTING TO SEE THAT THE ERROR NUMBER STORED IN $FATAL IS ONE WHICH IS DETECTED IN THE TEST WHOSE NUMBER IS IN $TESTN. IF THERE IS A DISAGREEMENT THEN THE ERROR BEING REPORTED IS A SEQUENCE ERROR. $TESTN CONTAINS ONE MORE THAN THE LAST TEST WHICH WAS SUCCESSFULLY COMPLETED.

3. $TESTN THIS LOCATION IS USED TO INDICATE THE NUMBER OF THE TEST WHICH WAS BEING EXECUTED WHEN THE FAULT WAS DETECTED. $TESTN IS USED IN CONJUNCTION WITH $FATAL TO DISTINGUISH BETWEEN SEQUENCE AND FUNCTIONAL ERRORS. (SEE 2. THIS SECTION)

4. $PASS THIS LOCATION IS USED TO INDICATE THE NUMBER OF SUCCESSFUL PASSES WHICH THE DIAGNOSTIC HAS COMPLETED. THIS WILL GIVE AN INDICATION THAT THE DIAGNOSTIC HAS NOT JUST BEEN HUNG IN A LOOP

   IF AN ERROR HAS BEEN DETECTED $PASS WILL SHOW WHETHER IT WAS A HARD ERROR DISCOVERED DURING THE FIRST TRY OR WHETHER IT WAS INTERMITTANT OR DEVELOPED DURING THE RUNNING OF THE DIAGNOSTIC.

```
425
426
427
428                                    5.2     SCOPING
429                                            -------
430
431                                    WHILE THIS DIAGNOSTIC IS PRIMARILY INTENDED TO BE A FAULT DETECTION
432                                    PROGRAM, PROVISIONS ARE MADE TO ASSIST A TECHNICIAN WHO MIGHT WANT
433                                    TO USE THE PROGRAM AS A TROUBLE SHOOTING TEST.
434
435                                    THE PROCEDURE FOR SCOPING A SUBTEST INVOLVES MODIFYING SEVERAL
436                                    MEMORY LOCATIONS IN THE TEST ITSELF. THE PHILOSOPHY IS TO PROVIDE
437                                    A SCOPING LOOP WHICH WILL INCLUDE THE CODE WHERE THE ERROR WAS DETECTED.
438                                    THE LOOP IS SET UP SO THAT THE LOOP WILL NOT BE TERMINATED SHOULD
439                                    THE ERROR INTERMITTANTLY DISAPPEAR.
440
441                                    THE PROCEDURE IS A FOLLOWS:
442
443                                    1.      DETERMIND WHICH ERROR IS TO BE SCOPED. USE $FATAL AND $TESTN
444                                            FOR THIS (SEE ABOVE)
445
446                                    2.      LOCATE THE ERROR ROUTINE IN THE LISTING.
447
448                                    3.      CLEAR THE RIGHT BYTE OF THE CONDITIONAL BRANCH INSTRUCTION
449                                            ASSOCIATED WITIH THE ERROR. (THIS IS MARKED WITH <====='S IN THE
450                                            LISTING.)
451
452                                    4.      REPLACE THE INSTRUCTION FOLLOWING <MOV #XXX,-(R2)) WITH THE
453                                            SCOPING BRANCH PROVIDED IN THE LISTING COMMENTS.
454
455                                    5.      RESTART THE PROGRAM. THE PROGRAM MAY BE RESTARTED FROM THE
456                                            BEGINNING OR FROM THE SUBTEST (SEE 2.0).
457
458                                6.0     LISTING
459                                        --------%
460
556                                .TITLE CKKAABO 11/44 CPU/EIS
557 000000                         .ENABLE ABS
558         001000                 STBOT=1000
559                                .NLIST  CND,MC,MD
560                                .LIST   ME
561         000240                 SCOPE=NOP
562         000007                 R7=%7
563         000006                 R6=%6
564         177776                 PS=177776
565         177564                 TPS=177564
566         177566                 TPB=177566
567         140000                 USRM=140000
568         030000                 PUSRM=30000
569         177772                 PIRQ=177772
570         000020                 BIT4=20
571         000007                 MFPT=7
579                            .MCALL  .$APTHDR,.$APTBLS,.$ACT11
580                            .MCALL  .$CATCH,.1170
581                            .SBTTL  BASIC DEFINITIONS
                               ;*INITIAL ADDRESS OF THE STACK POINTER *** 1100 ***
            001100             STACK=  1100            ;;FIRST ADDRESS OF THE STACK
```

```
001100                  KERSTK= STACK           ;;KERNEL STACK
000700                  SUPSTK= STACK-200       ;;SUPERVISOR STACK
000600                  USESTK= STACK-300       ;;USER STACK
104000                        ERROR=EMT
000004                        SCOPE=IOT
177776                  PS=     177776          ;;PROCESSOR STATUS WORD
177776                        PSW=PS
177774                  STKLMT= 177774          ;;STACK LIMIT REGISTER
177772                  PIRQ=   177772          ;;PROGRAM INTERRUPT REQUEST REGISTER
177570                  DSWR=   177570          ;;HARDWARE SWITCH REGISTER
177570                  DDISP=  177570          ;;HARDWARE DISPLAY REGISTER
177546                  LKS=    177546          ;;LINE CLOCK (KW11-L) STATUS REGISTER
                        ;*MISCELLANEOUS DEFINITIONS
000011                  HT=     11              ;;CODE FOR HORIZONTAL TAB
000012                  LF=     12              ;;CODE LINE FEED
000015                  CR=     15              ;;CODE CARRIAGE RETURN
000200                  CRLF=   200             ;;CODE FOR CARRIAGE RETURN-LINE FEED
                        ;*GENERAL PURPOSE REGISTER DEFINITIONS
000000                  R0=     %0              ;;GENERAL REGISTER
000001                  R1=     %1              ;;GENERAL REGISTER
000002                  R2=     %2              ;;GENERAL REGISTER
000003                  R3=     %3              ;;GENERAL REGISTER
000004                  R4=     %4              ;;GENERAL REGISTER
000005                  R5=     %5              ;;GENERAL REGISTER
000006                  R6=     %6              ;;GENERAL REGISTER
000007                  R7=     %7              ;;GENERAL REGISTER
000000                        R10=R0
000001                        R11=R1
000002                        R12=R2
000003                        R13=R3
000004                        R14=R4
000005                        R15=R5
000006                  SP=     %6              ;;STACK POINTER
000006                        KSP=SP
000006                        SSP=SP
000006                        USP=SP
000007                  PC=     %7              ;;PROGRAM COUNTER
                        ;*PRIORITY LEVEL DEFINITIONS
000000                  PR0=    0               ;;PRIORITY LEVEL 0
000040                  PR1=    40              ;;PRIORITY LEVEL 1
000100                  PR2=    100             ;;PRIORITY LEVEL 2
000140                  PR3=    140             ;;PRIORITY LEVEL 3
000200                  PR4=    200             ;;PRIORITY LEVEL 4
000240                  PR5=    240             ;;PRIORITY LEVEL 5
000300                  PR6=    300             ;;PRIORITY LEVEL 6
000340                  PR7=    340             ;;PRIORITY LEVEL 7
                        ;*''SWITCH REGISTER'' SWITCH DEFINITIONS
100000                  SW15=   100000
040000                  SW14=   40000
020000                  SW13=   20000
010000                  SW12=   10000
004000                  SW11=   4000
002000                  SW10=   2000
001000                  SW09=   1000
000400                  SW08=   400
000200                  SW07=   200
000100                  SW06=   100
```

```
000040                  SW05=   40
000020                  SW04=   20
000010                  SW03=   10
000004                  SW02=   4
000002                  SW01=   2
000001                  SW00=   1
001000                          SW9=SW09
000400                          SW8=SW08
000200                          SW7=SW07
000100                          SW6=SW06
000040                          SW5=SW05
000020                          SW4=SW04
000010                          SW3=SW03
000004                          SW2=SW02
000002                          SW1=SW01
000001                          SW0=SW00
                        ;*DATA BIT DEFINITIONS (BIT00 TO BIT15)
100000                  BIT15=  100000
040000                  BIT14=  40000
020000                  BIT13=  20000
010000                  BIT12=  10000
004000                  BIT11=  4000
002000                  BIT10=  2000
001000                  BIT09=  1000
000400                  BIT08=  400
000200                  BIT07=  200
000100                  BIT06=  100
000040                  BIT05=  40
000020                  BIT04=  20
000010                  BIT03=  10
000004                  BIT02=  4
000002                  BIT01=  2
000001                  BIT00=  1
001000                          BIT9=BIT09
000400                          BIT8=BIT08
000200                          BIT7=BIT07
000100                          BIT6=BIT06
000040                          BIT5=BIT05
000020                          BIT4=BIT04
000010                          BIT3=BIT03
000004                          BIT2=BIT02
000002                          BIT1=BIT01
000001                          BIT0=BIT00
                        ;*BASIC ''CPU'' TRAP VECTOR ADDRESSES
000004                  ERRVEC= 4               ;;TIME OUT AND OTHER ERRORS
000010                  RESVEC= 10              ;;RESERVED AND ILLEGAL INSTRUCTIONS
000014                  TBITVEC=14              ;;''T'' BIT
000014                  TRTVEC= 14              ;;TRACE TRAP
000014                  BPTVEC= 14              ;;BREAKPOINT TRAP (BPT)
000020                  IOTVEC= 20              ;;INPUT/OUTPUT TRAP (IOT) **SCOPE**
000024                  PWRVEC= 24              ;;POWER FAIL
000030                  EMTVEC= 30              ;;EMULATOR TRAP (EMT) **ERROR**
000034                  TRAPVEC=34              ;;''TRAP'' TRAP
000060                  TKVEC=  60              ;;TTY KEYBOARD VECTOR
000064                  TPVEC=  64              ;;TTY PRINTER VECTOR
000100                  LKVEC=  100             ;;LINE CLOCK (KW11-L) VECTER
000114                  CACHVEC=114             ;;CACHE ERROR INTERRUPT VECTOR
```

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000240                  PIRQVEC=240             ;;PROGRAM INTERRUPT REQUEST VECTOR
000250                  MMVEC=  250             ;;MEMORY MANAGEMENT VECTOR
                        .SBTTL  CACHE   REGISTER DEFINITIONS
177740                  LOADRS = 177740         ;;LOWER 16 BITS OF ADDRESS THAT CAUSED ERROR
177742                  HIADRS = 177742         ;;UPPER SIX BITS OF ADDRESS THAT CAUSED ERROR
177744                  MEMERR = 177744         ;;CACHE ERROR REGISTER
177746                  CONTRL = 177746         ;;MEMORY CONTROL REGISTER
177750                  MAINT  = 177750         ;;MEMORY MAINTENENCE REGISTER
177752                  HITMIS = 177752         ;;HIT MISS REGISTER "1" IMPLIES HIT IN CACHE
                        .SBTTL  CPU REGISTER DEFINITIONS
177760                  SIZELO = 177760         ;;MEMORY SIZE REGISTER NUMBER TO PUT INTO A PAR
                                                ;;TO GET TO THE LAST 32 WORDS OF MEMORY
177762                  SIZEHI = 177762         ;;HIGH SIZE REGISTER, RESERVED FOR FUTURE USE
                                                ;;CURRENTLY ALL ZERO
177764                  SYSTID = 177764         ;;SYSTEM ID REGISTER
177766                  CPUERR = 177766         ;;CPU ERROR REGISTER HOLDS CONDITION THAT CAUSED
                                                ;;THE TRAP TO ERRVEC (000004)
                        .SBTTL  MEMORY MANAGEMENT DEFINITIONS
                        ;*MEMORY MANAGEMENT STATUS REGISTER ADDRESSES
177572                  MMR0=   177572
177574                  MMR1=   177574
177576                  MMR2=   177576
172516                  MMR3=   172516
177572                          SR0=MMR0
177574                          SR1=MMR1
177576                          SR2=MMR2
172516                          SR3=MMR3
                        ;*USER "I" PAGE DESCRIPTOR REGISTERS
177600                  UIPDR0= 177600
177602                  UIPDR1= 177602
177604                  UIPDR2= 177604
177606                  UIPDR3= 177606
177610                  UIPDR4= 177610
177612                  UIPDR5= 177612
177614                  UIPDR6= 177614
177616                  UIPDR7= 177616
                        ;*USER "D" PAGE DESCRIPTOR REGISTORS
177620                  UDPDR0= 177620
177622                  UDPDR1= 177622
177624                  UDPDR2= 177624
177626                  UDPDR3= 177626
177630                  UDPDR4= 177630
177632                  UDPDR5= 177632
177634                  UDPDR6= 177634
177636                  UDPDR7= 177636
                        ;*USER "I" PAGE ADDRESS REGISTERS
177640                  UIPAR0= 177640
177642                  UIPAR1= 177642
177644                  UIPAR2= 177644
177646                  UIPAR3= 177646
177650                  UIPAR4= 177650
177652                  UIPAR5= 177652
177654                  UIPAR6= 177654
177656                  UIPAR7= 177656
                        ;*USER "D" PAGE ADDRESS REGISTERS
177660                  UDPAR0= 177660
177662                  UDPAR1= 177662
```

```
                177664          UDPAR2= 177664
                177666          UDPAR3= 177666
                177670          UDPAR4= 177670
                177672          UDPAR5= 177672
                177674          UDPAR6= 177674
                177676          UDPAR7= 177676
                                ;*SUPERVISOR ''I'' PAGE DESCRIPTOR REGISTERS
                172200          SIPDR0= 172200
                172202          SIPDR1= 172202
                172204          SIPDR2= 172204
                172206          SIPDR3= 172206
                172210          SIPDR4= 172210
                172212          SIPDR5= 172212
                172214          SIPDR6= 172214
                172216          SIPDR7= 172216
                                ;*SUPERVISOR ''D'' PAGE DESCRIPTOR REGISTERS
                172220          SDPDR0= 172220
                172222          SDPDR1= 172222
                172224          SDPDR2= 172224
                172226          SDPDR3= 172226
                172230          SDPDR4= 172230
                172232          SDPDR5= 172232
                172234          SDPDR6= 172234
                172236          SDPDR7= 172236
                                ;*SUPERVISOR ''I'' PAGE ADDRESS REGISTERS
                172240          SIPAR0= 172240
                172242          SIPAR1= 172242
                172244          SIPAR2= 172244
                172246          SIPAR3= 172246
                172250          SIPAR4= 172250
                172252          SIPAR5= 172252
                172254          SIPAR6= 172254
                172256          SIPAR7= 172256
                                ;*SUPERVISOR 'D'' PAGE ADDRESS REGISTERS
                172260          SDPAR0= 172260
                172262          SDPAR1= 172262
                172264          SDPAR2= 172264
                172266          SDPAR3= 172266
                172270          SDPAR4= 172270
                172272          SDPAR5= 172272
                172274          SDPAR6= 172274
                172276          SDPAR7= 172276
                                ;*KERNEL ''I'' PAGE DESCRIPTOR REGISTERS
                172300          KIPDR0= 172300
                172302          KIPDR1= 172302
                172304          KIPDR2= 172304
                172306          KIPDR3= 172306
                172310          KIPDR4= 172310
                172312          KIPDR5= 172312
                172314          KIPDR6= 172314
                172316          KIPDR7= 172316
                                ;*KERNEL 'D'' PAGE DESCRIPTOR REGISTERS
                172320          KDPDR0= 172320
                172322          KDPDR1= 172322
                172324          KDPDR2= 172324
                172326          KDPDR3= 172326
                172330          KDPDR4= 172330
```

```
172332                  KDPDR5= 172332
172334                  KDPDR6= 172334
172336                  KDPDR7= 172336
                        ;*KERNEL ''I'' PAGE ADDRESS REGISTERS
172340                  KIPAR0= 172340
172342                  KIPAR1= 172342
172344                  KIPAR2= 172344
172346                  KIPAR3= 172346
172350                  KIPAR4= 172350
172352                  KIPAR5= 172352
172354                  KIPAR6= 172354
172356                  KIPAR7= 172356
                        ;*KERNEL 'D'' PAGE ADDRESS REGISTERS
172360                  KDPAR0= 172360
172362                  KDPAR1= 172362
172364                  KDPAR2= 172364
172366                  KDPAR3= 172366
172370                  KDPAR4= 172370
172372                  KDPAR5= 172372
172374                  KDPAR6= 172374
172376                  KDPAR7= 172376
                        .SBTTL  UNIBUS MAP REGISTER DEFINITIONS
                        ;*THE LOWER 16 BITS OF THE MAP REGISTERS ARE LABELED 'MAPLXX'
                        ;*THE UPPER 6 BITS OF THE MAP REGISTERS ARE LABELED 'MAPHXX'
170200                  MAPL00 = 170200
170202                  MAPH00 = 170202
170204                  MAPL01 = 170204
170206                  MAPH01 = 170206
170210                  MAPL02 = 170210
170212                  MAPH02 = 170212
170214                  MAPL03 = 170214
170216                  MAPH03 = 170216
170220                  MAPL04 = 170220
170222                  MAPH04 = 170222
170224                  MAPL05 = 170224
170226                  MAPH05 = 170226
170230                  MAPL06 = 170230
170232                  MAPH06 = 170232
170234                  MAPL07 = 170234
170236                  MAPH07 = 170236
170240                  MAPL10 = 170240
170242                  MAPH10 = 170242
170244                  MAPL11 = 170244
170246                  MAPH11 = 170246
170250                  MAPL12 = 170250
170252                  MAPH12 = 170252
170254                  MAPL13 = 170254
170256                  MAPH13 = 170256
170260                  MAPL14 = 170260
170262                  MAPH14 = 170262
170264                  MAPL15 = 170264
170266                  MAPH15 = 170266
170270                  MAPL16 = 170270
170272                  MAPH16 = 170272
170274                  MAPL17 = 170274
170276                  MAPH17 = 170276
170300                  MAPL20 = 170300
```

UNIBUS MAP REGISTER DEFINITIONS

```
                170302                  MAPH20 = 170302
                170304                  MAPL21 = 170304
                170306                  MAPH21 = 170306
                170310                  MAPL22 = 170310
                170312                  MAPH22 = 170312
                170314                  MAPL23 = 170314
                170316                  MAPH23 = 170316
                170320                  MAPL24 = 170320
                170320                  MAPH24 = 170320
                170324                  MAPL25 = 170324
                170326                  MAPH25 = 170326
                170330                  MAPL26 = 170330
                170332                  MAPH26 = 170332
                170334                  MAPL27 = 170334
                170336                  MAPH27 = 170336
                170340                  MAPL30 = 170340
                170342                  MAPH30 = 170342
                170344                  MAPL31 = 170344
                170346                  MAPH31 = 170346
                170350                  MAPL32 = 170350
                170352                  MAPH32 = 170352
                170354                  MAPL33 = 170354
                170356                  MAPH33 = 170356
                170360                  MAPL34 = 170360
                170362                  MAPH34 = 170362
                170364                  MAPL35 = 170364
                170366                  MAPH35 = 170366
                170370                  MAPL36 = 170370
                170372                  MAPH36 = 170372
                170374                  MAPL37 = 170374
                170376                  MAPH37 = 170376
                170200                          MAPL0=MAPL00
                170202                          MAPH0=MAPH00
                170204                          MAPL1=MAPL01
                170206                          MAPH1=MAPH01
                170210                          MAPL2=MAPL02
                170212                          MAPH2=MAPH02
                170214                          MAPL3=MAPL03
                170216                          MAPH3=MAPH03
                170220                          MAPL4=MAPL04
                170222                          MAPH4=MAPH04
                170224                          MAPL5=MAPL05
                170226                          MAPH5=MAPH05
                170230                          MAPL6=MAPL06
                170232                          MAPH6=MAPH06
                170234                          MAPL7=MAPL07
                170236                          MAPH7=MAPH07
582                             .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
583                             .SBTTL  ACT11 HOOKS
                                ;*****************************************************************************************
```

```
                                ;HOOKS REQUIRED BY ACT11
                                        $SVPC=.                 ;SAVE PC
                                        .=46
                                        $ENDAD                  ;;1)SET LOC.46 TO ADDRESS OF $ENDAD IN .$EOP
                                        .=52
                                        .WORD   0               ;;2)SET LOC.52 TO ZERO
                                        .=$SVPC                 ;; RESTORE PC
                                        .=300
                                .SBTTL  APT MAILBOX-ETABLE
                                ;*******************************************************************************
                                .EVEN
                                $MAIL:                          ;;APT MAILBOX
                                $MSGTY: .WORD   AMSGTY          ;;MESSAGE TYPE CODE
                                $FATAL: .WORD   AFATAL          ;;FATAL ERROR NUMBER
                                $TESTN: .WORD   ATESTN          ;;TEST NUMBER
                                $PASS:  .WORD   APASS           ;;PASS COUNT
                                $DEVCT: .WORD   ADEVCT          ;;DEVICE COUNT
                                $UNIT:  .WORD   AUNIT           ;;I/O UNIT NUMBER
                                $MSGAD: .WORD   AMSGAD          ;;MESSAGE ADDRESS
                                $MSGLG: .WORD   AMSGLG          ;;MESSAGE LENGTH
                                $ETABLE:                        ;;APT ENVIRONMENT TABLE
                                $ENV:   .BYTE   AENV            ;;ENVIRONMENT BYTE
                                $ENVM:  .BYTE   AENVM           ;;ENVIRONMENT MODE BITS
                                $SWREG: .WORD   ASWREG          ;;APT SWITCH REGISTER
                                $USWR:  .WORD   AUSWR           ;;USER SWITCHES
                                $CPUOP: .WORD   ACPUOP          ;;CPU TYPE,OPTIONS
                                ;*                              BITS 15-11=CPU TYPE
                                ;*                                      11/04=01,11/05=02,11/20=03,11/40=04,11/45=05
                                ;*                                      11/70=06,PDQ=07,Q=10
                                ;*                              BIT 10=REAL TIME CLOCK
                                ;*                              BIT  9=FLOATING POINT PROCESSOR
                                ;*                              BIT  8=MEMORY MANAGEMENT
                                $ETEND:
                                .MEXIT
                                .SBTTL  APT PARAMETER BLOCK
                                ;*******************************************************************************
                                ;SET LOCATIONS 24 AND 44 AS REQUIRED FOR APT
                                ;*******************************************************************************
                                        .$X=.   ;;SAVE CURRENT LOCATION
                                        .=24    ;;SET POWER FAIL TO POINT TO START OF PROGRAM
                                        200     ;;FOR APT START UP
                                        .=44    ;;POINT TO APT INDIRECT ADDRESS PNTR.
                                        $APTHDR ;;POINT TO APT HEADER BLOCK
                                        .=.$X   ;;RESET LOCATION COUNTER
                                ;*******************************************************************************
                                ;SETUP APT PARAMETER BLOCK AS DEFINED IN THE APT-PDP11 DIAGNOSTIC
                                ;INTERFACE SPEC.
                                $APTHD:
                                $HIBTS: .WORD   0       ;;TWO HIGH BITS OF 18 BIT MAILBOX ADDR.
                                $MBADR: .WORD   $MAIL   ;;ADDRESS OF APT MAILBOX (BITS 0-15)
                                $TSTM:  .WORD   10      ;;RUN TIM OF LONGEST TEST
                                $PASTM: .WORD   10      ;;RUN TIME IN SECS. OF 1ST PASS ON 1 UNIT (QUICK VERIFY)
                                $UNITM: .WORD   0       ;;ADDITIONAL RUN TIME (SECS) OF A PASS FOR EACH ADDITIONAL UNIT
                                        .WORD   $ETEND-$MAIL/2 ;;LENGTH MAILBOX-ETABLE(WORDS)
                                ;*******************************************************************************
                                ;SOME POINTERS TO CPU TRAP HANDLERS
                                ;*******************************************************************************
```

```
                    000004                          .=4
000004  042402                                      TO4
000006  000000                                      0
000010  042416                                      TO10
000012  000000                                      0
000014  042432                                      TO14
000016  000000                                      0
                    000030                          .=30
000030  042446                                      TO30
000032  000000                                      0
000034  042462                                      TO34
000036  000000                                      0
                    000114                          .=114
000114  042476                                      TO114
000116  000000                                      0
                    000244                          .=244
000244  042512                                      TO244
000246  000000                                      0
000250  042526                                      TO250
000252  000000                                      0

                                        ;*****************************************************************************
                                        ;DATA TABLE FOR USE IN ADDRESSING MODE TESTS
                                        ;*****************************************************************************
                    000370                          .=370
000370  000000  000000  000000                      0,0,0,0,0,0
000376  000000  000000  000000
000404  000001  000001  177777                      1,1,-1
                    001100                          .=1100
                                        ;*****************************************************************************
                                        ;SET UP STARTING ADDRESS
                    001100                          .$X=.
                    000200                          .=200
000200  000167  000674                              JMP     START

000204  012706  001000                              MOV     #STBOT,R6           ;SET STACK POINTER
000210  012702  000304                              MOV     #$TESTN,R2          ;SET MAILBOX POINTER
000214  000137                                      JMP     @(PC)+              ;JUMP TO SUBTEST
000216  000000                                      0                           ;ADDR. OF SUBTEST GOES HERE

                    001100                          .=.$X
                    000302              $ERROR=$FATAL
                    000304              $TSTNM=$TESTN
001100  012737  042266  000024          START:  MOV     #PWRDN,@#24             ;SET UP FOR POWER FAIL
001106  012737  000000  000306                  MOV     #0,@#$PASS      ;CLEAR PASS COUNT
001114  012737  177777  042100                  MOV     #-1,@#PASSPT    ;SET PRINT COUNTER
001122  012706  001000                  RESTRT: MOV     #STBOT,R6       ;INITIALIZE STACK POINTER
001126  012702  000304                          MOV     #$TESTN,R2      ;SET UP POINTER TO MESSAGE TYPE
001132  012737  000000  000304                  MOV     #0,@#$TSTNM     ;CLEAR TEST NUMBER
001140  012737  000000  000302                  MOV     #0,@#$ERROR     ;CLEAR ERROR NUMBER
001146  012737  000000  000300                  MOV     #0,@#$MSGTY     ;CLEAR MESSAGE TYPE(FOR APT)
```

```
                                .SBTTL  TEST # 1 - CHECK BRANCHES ON Z BIT
                                ;*****************************************************************************
                                ;TEST 1 - CHECK BRANCHES ON Z BIT
                                ;*****************************************************************************
001154  005212                  TST1:   INC     (R2)            ;UPDATE TEST NUMBER
001156  022712  000001                  CMP     #1,(R2)         ;SEQUENCE ERROR?
001162  001034                          BNE     TST2-10         ;BR TO ERROR HALT ON SEQ ERROR
001164  000257                          CCC                     ;CLEAR ALL CONDITION CODES
001166  001401                          BEQ     BR1             ;SHOULD BRANCH
001170  000406                          BR      BR2             ;BAD BRANCH OF Z-BIT
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           BRANCH INSTRUCTION AND         <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           FOLLOWING W/ 774               <====
001172                          BR1:
001172  012762  000001  177776          MOV     #1,-2(R2)       ;MOVE TO MAILBOX #  *******  1  *******
001200  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
001204  000000                          HALT                    ;SHOULD HAVE BRANCHED: Z=0
001206                          BR2:
001206  001006                          BNE     BR3
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 765           <====
001210  012762  000002  177776          MOV     #2,-2(R2)       ;MOVE TO MAILBOX #  *******  2  *******
001216  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
001222  000000                          HALT                    ;
001224  000264                  BR3:    SEZ
001226  001001                          BNE     BR4
001230  000406                          BR      BR5
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           BRANCH INSTRUCTION AND         <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           FOLLOWING W/ 760               <====
001232                          BR4:
001232  012762  000003  177776          MOV     #3,-2(R2)       ;MOVE TO MAILBOX #  *******  3  *******
001240  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
001244  000000                          HALT                    ;SHOULD NOT HAVE BRANCHED HERE ON Z=1
001246                          BR5:
001246  001406                          BEQ     TST2
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 745           <====
001250  012762  000004  177776          MOV     #4,-2(R2)       ;MOVE TO MAILBOX #  *******  4  *******
001256  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
001262  000000                          HALT                    ;SHOULD HAVE BRANCHED ON Z=1
                                                                ;  OR SEQUENCE ERROR

                                ;*****************************************************************************
                                .SBTTL  DATA PATH TESTS
                                ;
                                ;       THE DATA PATH TESTS ARE USED TO VERIFY THAT VARIOUS
                                ;DATA PATTERNS CAN BE SUCCESSFULLY MOVED THROUGH THE DATA PATHS
                                ;MOVE AND COMPARE MODE 2,3 INSTRUCTIONS ARE USED TO PASS AND
                                ;TEST VARIOUS DATA PATTERNS IN THE DATA PATHS.
                                ;       THE TEST EXERCISES THE INTERNAL DATA PATHS, THE UNIBUS
```

```
                        ;DATA TRANSCIEVERS, AND AMUX CONTROL FOR ALU AND UBUS INPUTS.
                        ;       IF THESE TESTS FAIL, EXAMINE THE TARGET LOCATION (LOC. 0)
                        ;TO SEE WHICH BITS OF THE DATA PATH ARE FAILING.  IF THIS PROVIDES
                        ;INCONCLUSIVE DATA, TRY TO CHECK MODE 3 IR DECODE BY RUNNING
                        ;JUST THE MICROCODE AND IR DECODE TESTS FOR THE MOVE AND COMPARE
                        ;INSTRUCTIONS.
```

```
675                                     .SBTTL  TEST # 2 - TEST OF ZEROES IN THE DATA PATH
                                        ;*****************************************************************************
                                        ;TEST 2 - TEST OF ZEROES IN THE DATA PATH
                                        ;*****************************************************************************
    001264  005212                      TST2:   INC     (R2)            ;UPDATE TEST NUMBER
    001266  022712  000002              CMP     #2,(R2)                 ;SEQUENCE ERROR?
    001272  001010                      BNE     TST3-10                 ;BR TO ERROR HALT ON SEQ ERROR
676 001274  012737  000000  000000      MOV     #0,@#0                  ;MOVE ZEROES THRU ADDRESS LINES, DATA
677                                                                     ;LINES AND INTERNAL PATHS
678 001302  005737  000000              TST     @#0                     ;SUCCESSFUL?
679 001306  001406                      BEQ     TST3
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 771           <====
    001310  012762  000005  177776      MOV     #5,-2(R2)               ;MOVE TO MAILBOX #  *******  5  *******
    001316  005262  177774              INC     -4(R2)                  ;SET MSGTYP TO FATAL ERROR
    001322  000000                      HALT                            ;DATA INCORRECT
                                                                        ;  OR SEQUENCE ERROR
680
```

```
681                                     .SBTTL  TEST # 3 - TEST OF PATTERN 125252 IN DATA PATH
                                        ;*************************************************************************
                                        ;TEST 3 - TEST OF PATTERN 125252 IN DATA PATH
                                        ;*************************************************************************
    001324  005212                      TST3:   INC     (R2)            ;UPDATE TEST NUMBER
    001326  022712  000003              CMP     #3,(R2)         ;SEQUENCE ERROR?
    001332  001011                      BNE     TST4-10         ;BR TO ERROR HALT ON SEQ ERROR
682 001334  012737  125252  000000      MOV     #125252,@#0     ;MOVE ALTERNATING ONES AND ZEROES
683                                                             ;THRU DATA PATHS
684 001342  022737  125252  000000      CMP     #125252,@#0     ;SUCCESSFUL
685 001350  001406                      BEQ     TST4
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 770           <====
    001352  012762  000006  177776      MOV     #6,-2(R2)       ;MOVE TO MAILBOX #  *******  6  *******
    001360  005262  177774              INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
    001364  000000                      HALT                    ;DATA INCORRECT
                                                                ;  OR SEQUENCE ERROR
686
```

```
687                                     .SBTTL  TEST # 4 - TEST OF PATTERN 052525 IN DATA PATH
                                        ;*************************************************************************
                                        ;TEST 4 - TEST OF PATTERN 052525 IN DATA PATH
                                        ;*************************************************************************
     001366  005212                     TST4:   INC     (R2)            ;UPDATE TEST NUMBER
     001370  022712  000004                     CMP     #4,(R2)         ;SEQUENCE ERROR?
     001374  001011                             BNE     TST5-10         ;BR TO ERROR HALT ON SEQ ERROR
688  001376  012737  052525  000000             MOV     #052525,@#0     ;MOVE ALTERNATING ZEROES AND ONES
689                                                                     ;THRU DATA PATH
690  001404  022737  052525  000000             CMP     #052525,@#0     ;SUCCESSFUL?
691  001412  001406                             BEQ     TST5
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 770           <====
     001414  012762  000007  177776             MOV     #7,-2(R2)       ;MOVE TO MAILBOX #  *******  7  *******
     001422  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     001426  000000                             HALT                    ;DATA INCORRECT
                                                                        ;  OR SEQUENCE ERROR
692
```

```
                                .SBTTL  TEST # 5 - TEST OF ALL ONES IN DATA PATH
                                ;*****************************************************************************
                                ;TEST 5 - TEST OF ALL ONES IN DATA PATH
                                ;*****************************************************************************
001430  005212                TST5:   INC     (R2)            ;UPDATE TEST NUMBER
001432  022712  000005                CMP     #5,(R2)         ;SEQUENCE ERROR?
001436  001011                        BNE     TST6-10         ;BR TO ERROR HALT ON SEQ ERROR
694 001440  012737  177777  000000    MOV     #177777,@#0     ;MOVE ONES THRU DATA PATH
695 001446  022737  177777  000000    CMP     #177777,@#0     ;SUCCESSFUL
696 001454  001406                    BEQ     TST6
                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                            ;           CONDITIONAL BRANCH INST. AND   <====
                                                            ;           REPLACE THE MOVE INSTRUCTION   <====
                                                            ;           WHICH FOLLOWS W/ 770           <====
001456  012762  000010  177776        MOV     #10,-2(R2)      ;MOVE TO MAILBOX #  *******  10  *******
001464  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
001470  000000                        HALT                    ;DATA INCORRECT
                                                            ;  OR SEQUENCE ERROR
697
698                             ;*****************************************************************************
699                             .SBTTL  B-REGISTER TEST
700                             ;
701                             ;       THE B-REGISTER SHIFTING LOGIC TESTS ARE USED TO TEST THAT THE
702                             ;B-REGISTER CAN HOLD VARIOUS DATA PATTERNS AND THAT THE ASSOCIATED
703                             ;LOGIC SUPPORTS THE SHIFTING FUNCTIONS WITHIN THE B-REGISTER AND C-BIT.
704                             ;A ONE IS SHIFTED THROUGH EVERY BIT IN THE B-REGISTER AND C-BIT IN
705                             ;BOTH DIRECTIONS.
706                             ;       THE B-REGISTER ITSELF IS TESTED IN ITS ABILITY AS A BUFFER AND AS
707                             ;A SHIFT REGISTER.  DATA IS ALSO PASSED THROUGH THE DATA PATH AND ALU.
708                             ;       IF THESE TESTS FAIL, EXAMINE THE TARGET LOCATION (LOC. 0) TO SEE
709                             ;WHICH BITS OF THE B-REGISTER MAY BE FAILING.  IF THIS PROVIDES
710                             ;INCONCLUSIVE DATA TRY TO CHECK THE MODE 3 IR DECODE BY RUNNING JUST
711                             ;THE MICROCODE AND IR DECODE TESTS FOR THE PARTICULAR INSTRUCTIONS.
712                             ;
```

```
713                                     .SBTTL  TEST # 6 - SHIFT BIT 0 TO BIT 1
                                        ;*****************************************************************************
                                        ;TEST 6 - SHIFT BIT 0 TO BIT 1
                                        ;*****************************************************************************
     001472  005212                     TST6:   INC     (R2)            ;UPDATE TEST NUMBER
     001474  022712  000006                     CMP     #6,(R2)         ;SEQUENCE ERROR?
     001500  001014                             BNE     TST7-10         ;BR TO ERROR HALT ON SEQ ERROR
714  001502  000241                             CLC                     ;CLEAR CARRY BIT
715  001504  012737  000001  000000             MOV     #1,@#0          ;LOAD A 1
716  001512  006137  000000                     ROL     @#0             ;SHIFT LEFT
717  001516  022737  000002  000000             CMP     #2,@#0          ;SUCCESSFUL
718  001524  001406                             BEQ     TST7
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 765           <====
     001526  012762  000011  177776             MOV     #11,-2(R2)      ;MOVE TO MAILBOX #  *******  11  *******
     001534  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     001540  000000                             HALT                    ;BIT 1 NOT SET
                                                                        ;  OR SEQUENCE ERROR
719
```

```
720                                     .SBTTL  TEST # 7 - SHIFT CARRY INTO BIT 0
                                        ;*******************************************************************************
                                        ;TEST 7 - SHIFT CARRY INTO BIT 0
                                        ;*******************************************************************************
001542  005212                  TST7:   INC     (R2)            ;UPDATE TEST NUMBER
001544  022712  000007                  CMP     #7,(R2)         ;SEQUENCE ERROR?
001550  001023                          BNE     TST10-10        ;BR TO ERROR HALT ON SEQ ERROR
721 001552  012737  000000  000000      MOV     #0,@#0          ;CLEAR LOCATION
722 001560  000261                      SEC                     ;SET CARRY
723 001562  006137  000000              ROL     @#0             ;ROTATE CARRY BIT TO BIT 0
724 001566  103020                      BCC     TST10
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 770           <====
001570  012762  000012  177776          MOV     #12,-2(R2)      ;MOVE TO MAILBOX #  *******  12  *******
001576  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
001602  000000                          HALT                    ;CARRY CLEAR
                                                                ;  OR SEQUENCE ERROR
725 001604  022737  000001  000000      CMP     #1,@#0          ;BIT 0 SET
726 001612  001406                      BEQ     TST10
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 756           <====
001614  012762  000013  177776          MOV     #13,-2(R2)      ;MOVE TO MAILBOX #  *******  13  *******
001622  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
001626  000000                          HALT                    ;BIT 0 NOT SET
                                                                ;  OR SEQUENCE ERROR
727
```

```
728                                     .SBTTL  TEST # 10 - LEFT SHIFT FROM BIT 0 TO C-BIT
                                        ;*************************************************************************
                                        ;TEST 10 - LEFT SHIFT FROM BIT 0 TO C-BIT
                                        ;*************************************************************************
001630  005212                          TST10:  INC     (R2)            ;UPDATE TEST NUMBER
001632  022712  000010                          CMP     #10,(R2)        ;SEQUENCE ERROR?
001636  001016                                  BNE     TST11-10        ;BR TO ERROR HALT ON SEQ ERROR
729 001640  012737  000001  000000              MOV     #1,@#0          ;SET BIT 0
730 001646  012700  177757                      MOV     #-21,R0         ;SET BIT COUNTER
731 001652  000241                              CLC                     ;CLEAR C-BIT
732 001654  005200                      SHL:    INC     R0              ;INCREMENT BIT COUNTER
733 001656  001404                              BEQ     SHLE            ;BR TO ERROR HALT IF BIT IS LOST
734 001660  006137  000000                      ROL     @#0             ;SHIFT LEFT ONE POSITION
735 001664  103373                              BCC     SHL             ;BRANCH IF C-BIT NOT SET
736 001666  001406                              BEQ     TST11
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 763           <====
C01670                                  SHLE:
001670  012762  000014  177776                  MOV     #14,-2(R2)      ;MOVE TO MAILBOX #  *******  14  *******
001676  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
001702  000000                                  HALT                    ;LEFT SHIFTING LOGIC FAILED
                                                ;  OR SEQUENCE ERROR
737
```

```
738                                     .SBTTL  TEST # 11 - SHIFT BIT 15 TO BIT 14
                                        ;*****************************************************************************
                                        ;TEST 11 - SHIFT BIT 15 TO BIT 14
                                        ;*****************************************************************************
     001704  005212                     TST11:  INC     (R2)            ;UPDATE TEST NUMBER
     001706  022712  000011                     CMP     #11,(R2)        ;SEQUENCE ERROR?
     001712  001014                             BNE     TST12-10        ;BR TO ERROR HALT ON SEQ ERROR
739  001714  012737  100000  000000             MOV     #100000,@#0     ;SET BIT 15
740  001722  000241                             CLC                     ;CLEAR CARRY
741  001724  006037  000000                     ROR     @#0             ;SHIFT BIT 15 TO BIT 14
742  001730  022737  040000  000000             CMP     #40000,@#0      ;SUCCESSFUL
743  001736  001406                             BEQ     TST12
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 765           <====
     001740  012762  000015  177776             MOV     #15,-2(R2)      ;MOVE TO MAILBOX #  *******  15  *******
     001746  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     001752  000000                             HALT    .               ;BIT 14 NOT SET
                                                                        ;  OR SEQUENCE ERROR
744
```

```
                                        .SBTTL  TEST # 12 - RIGHT SHIFT FROM BIT 15 TO C-BIT
                                        ;*****************************************************************************
                                        ;TEST 12 - RIGHT SHIFT FROM BIT 15 TO C-BIT
                                        ;*****************************************************************************
001754  005212                        TST12:  INC     (R2)            ;UPDATE TEST NUMBER
001756  022712  000012                        CMP     #12,(R2)        ;SEQUENCE ERROR?
001762  001016                                BNE     TST13-10        ;BR TO ERROR HALT ON SEQ ERROR
746 001764  012737  100000  000000            MOV     #100000,@#0     ;SET BIT 15
747 001772  012700  177757                    MOV     #-21,R0         ;SET BIT COUNTER
748 001776  000241                            CLC                     ;CLEAR C-BIT
749 002000  005200                      SHR:  INC     R0              ;INCREMENT BIT COUNTER
750 002002  001404                            BEQ     SHRE            ;BR TO ERROR HALT IF BIT IS LOST
751 002004  006037  000000                    ROR     @#0             ;ROTATE RIGHT ONE POSITION
752 002010  103373                            BCC     SHR             ;BRANCH IF C-BIT CLEAR
753 002012  001406                            BEQ     TST13
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                      ;           WHICH FOLLOWS W/ 763           <====
002014                                  SHRE:
002014  012762  000016  177776                MOV     #16,-2(R2)      ;MOVE TO MAILBOX #  *******  16  *******
002022  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
002026  000000                                HALT                    ;RIGHT SHIFT LOGIC FAILED
                                                                      ;  OR SEQUENCE ERROR
754
755                                     ;*****************************************************************************
756                                     .SBTTL  SCRATCH PAD TESTS
757                                     ;
758                                     ;       THE SCRATCH PAD TESTS ARE USED TO VERIFY THAT VARIOUS
759                                     ;DATA PATTERNS CAN BE SUCCESSFULLY HELD IN THE SCRATCH PAD
760                                     ;CIRCUITRY.  MOVE AND COMPARE INSTRUCTIONS ARE USED TO TEST THAT
761                                     ;R0 CAN HOLD VARIOUS DATA PATTERNS.  EACH DATA PATTERN IS
762                                     ;MOVED AND TESTED IN A SMALL LOOP CONVENIENT FOR SCOPING.  THE
763                                     ;SUCCESSFUL COMPLETION OF THESE TESTS SHOULD VERIFY THE CIRCUITRY EXTERNAL
764                                     ;TO THE SCRATCH PAD ITSELF.
765                                     ;       THE REMAINDER OF THE GENERAL REGISTERS ARE TESTED BY MOVING
766                                     ;A BIT INTO BIT 0 OF THE REGISTER AND SHIFTING IT LEFT ONE
767                                     ;BIT AT A TIME INTO THE CARRY BIT.  THE RESULT IS THEN CHECKED TO INSURE THAT
768                                     ;NO BITS WERE PICKED. THE PROCEDURE IS THEN REPEATED UNDER OPPOSITE
769                                     ;CONDITIONS. THE GENERAL REGISTER AND THE CARRY BIT ARE SET TO
770                                     ;ALL ONES, AND A ZERO IS SHIFTED LEFT FROM BIT 0 INTO THE CARRY BIT.
771                                     ;THE RESULT IS THEN CHECKED TO INSURE THAT NO ZEROES WERE PICKED.
772                                     ;       AT THIS POINT ALL OF THE GENERAL REGISTERS HAVE BEEN EXERCISED
773                                     ;AS WELL AS REGISTER 11.  REGISTERS 10 AND 12 HAVE BEEN ACCESSED BY
774                                     ;THE INSTRUCTIONS.  REGISTERS 13,14,AND 17 WILL BE TESTED LATER IN THE
775                                     ;MICROCODE TESTS.
776                                     ;       IF THE PATTERN TESTS WITH REGISTER 0 FAIL CHECK THE RESULTANT
777                                     ;DATA FOR A CLUE TO A FAULT IN THE EXTERNAL CIRCUITRY.  IF THE
778                                     ;PATTERN TESTS WITH R0 ARE SUCCESSFUL BUT THE TESTS WITH THE OTHER
779                                     ;REGISTERS FAIL, SUSPECT THE REGISTER SELECT LINES AND THEN THE SCRATCH
780                                     ;PAD ITSELF.
781                                     ;
```

```
782                                     .SBTTL  TEST # 13 - TEST IF R0 CAN HOLD ALL ZEROES
                                        ;*************************************************************************
                                        ;TEST 13 - TEST IF R0 CAN HOLD ALL ZEROES
                                        ;*************************************************************************
                                        ;
002030  005212                          TST13:  INC     (R2)            ;UPDATE TEST NUMBER
002032  022712  000013                          CMP     #13,(R2)        ;SEQUENCE ERROR?
002036  001006                                  BNE     TST14-10        ;BR TO ERROR HALT ON SEQ ERROR
783
784 002040  012700  000000                      MOV     #0,R0           ;MOVE ZEROES TO R0
785 002044  005700                              TST     R0              ;SUCCESSFUL?
786 002046  001406                              BEQ     TST14
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 773           <====
002050  012762  000017  177776                  MOV     #17,-2(R2)      ;MOVE TO MAILBOX #  *******  17  *******
002056  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
002062  000000                                  HALT                    ;R0 NOT 0
                                                                        ;  OR SEQUENCE ERROR
787
```

TEST # 14 - TEST IF R0 CAN HOLD ONES AND ZEROES

```
 788                                    .SBTTL  TEST # 14 - TEST IF R0 CAN HOLD ONES AND ZEROES
                                        ;******************************************************************************
                                        ;TEST 14 - TEST IF R0 CAN HOLD ONES AND ZEROES
                                        ;******************************************************************************
     002064  005212                     TST14:  INC     (R2)            ;UPDATE TEST NUMBER
     002066  022712  000014                     CMP     #14,(R2)        ;SEQUENCE ERROR?
     002072  001007                             BNE     TST15-10        ;BR TO ERROR HALT ON SEQ ERROR
 789 002074  012700  125252                     MOV     #125252,R0      ;MOVE ALTERNATING ONES AND ZEROES TO R0
 790 002100  020027  125252                     CMP     R0,#125252      ;SUCCESSFUL?
 791 002104  001406                             BEQ     TST15
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 772           <====
     002106  012762  000020  177776             MOV     #20,-2(R2)      ;MOVE TO MAILBOX #  *******  20  *******
     002114  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     002120  000000                             HALT                    ;R0 NOT 125252
                                                                        ;  OR SEQUENCE ERROR
 792
```

TEST # 15 - TEST IF R0 CAN HOLD ZEROES AND ONES

```
793                                     .SBTTL  TEST # 15 - TEST IF R0 CAN HOLD ZEROES AND ONES
                                        ;*************************************************************************
                                        ;TEST 15 - TEST IF R0 CAN HOLD ZEROES AND ONES
                                        ;*************************************************************************
    002122  005212                      TST15:  INC     (R2)            ;UPDATE TEST NUMBER
    002124  022712  000015                      CMP     #15,(R2)        ;SEQUENCE ERROR?
    002130  001007                              BNE     TST16-10        ;BR TO ERROR HALT ON SEQ ERROR
794 002132  012700  052525                      MOV     #052525,R0      ;MOVE ALTERNATING ZEROES AND ONES TO R0
795 002136  020027  052525                      CMP     R0,#052525      ;SUCCESSFUL?
796 002142  001406                              BEQ     TST16
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 772           <====
    002144  012762  000021  177776              MOV     #21,-2(R2)      ;MOVE TO MAILBOX #  *******  21  *******
    002152  005262  177774                      INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
    002156  000000                              HALT                    ;R0 NOT 52525
                                                                        ;  OR SEQUENCE ERROR
797
```

```
798                                     .SBTTL  TEST # 16 - TEST IF R0 CAN HOLD ALL ONES
                                        ;*****************************************************************************
                                        ;TEST 16 - TEST IF R0 CAN HOLD ALL ONES
                                        ;*****************************************************************************
     002160  005212                     TST16:  INC     (R2)            ;UPDATE TEST NUMBER
     002162  022712  000016                     CMP     #16,(R2)        ;SEQUENCE ERROR?
     002166  001007                             BNE     TST17-10        ;BR TO ERROR HALT ON SEQ ERROR
799  002170  012700  177777                     MOV     #177777,R0      ;MOVE ALL ONES TO R0
800  002174  020027  177777                     CMP     R0,#177777      ;SUCCESSFUL?
801  002200  001406                             BEQ     TST17
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 772           <====
     002202  012762  000022  177776             MOV     #22,-2(R2)      ;MOVE TO MAILBOX #  *******  22  *******
     002210  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     002214  000000                             HALT                    ;R0 NOT 177777
                                                                        ;  OR SEQUENCE ERROR
802
```

```
803                                     .SBTTL  TEST # 17 - TEST IF R1 CAN HOLD A ONE IN ALL BITS
                                        ;*****************************************************************************
                                        ;TEST 17 - TEST IF R1 CAN HOLD A ONE IN ALL BITS
                                        ;*****************************************************************************
     002216  005212                     TST17:  INC     (R2)            ;UPDATE TEST NUMBER
     002220  022712  000017                     CMP     #17,(R2)        ;SEQUENCE ERROR?
     002224  001014                             BNE     TST20-10        ;BR TO ERROR HALT ON SEQ ERROR
804  002226  012701  000001                     MOV     #1,R1           ;SET BIT 0
805  002232  012700  177757                     MOV     #-21,R0         ;SET BIT COUNTER
806  002236  000241                             CLC                     ;CLEAR C-BIT
807  002240  005200                     REG1:   INC     R0              ;INCREMENT BIT COUNTER
808  002242  001403                             BEQ     REG1E           ;BR TO ERROR HALT IF BIT IS LOST
809  002244  006101                             ROL     R1              ;ROTATE 1 POSITION
810  002246  103374                             BCC     REG1            ;ALL DONE
811  002250  001406                             BEQ     TST20
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 765           <====
     002252                             REG1E:
     002252  012762  000023  177776             MOV     #23,-2(R2)      ;MOVE TO MAILBOX #  *******  23  *******
     002260  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     002264  000000                             HALT                    ;FAILURE WITH R1
                                                ;  OR SEQUENCE ERROR
812
```

```
                                .SBTTL  TEST # 20 - TEST IF R1 CAN HOLD A ZERO IN ALL BITS
                                ;******************************************************************************
                                ;TEST 20 - TEST IF R1 CAN HOLD A ZERO IN ALL BITS
                                ;******************************************************************************
002266  005212                  TST20:  INC     (R2)            ;UPDATE TEST NUMBER
002270  022712  000020                  CMP     #20,(R2)        ;SEQUENCE ERROR?
002274  001016                          BNE     TST21-10        ;BR TO ERROR HALT ON SEQ ERROR
814 002276  012701  177776              MOV     #-2,R1          ;SET ALL ONES IN R1 EXCEPT FOR BIT 0
815 002302  012700  177757              MOV     #-21,R0         ;SET BIT COUNTER
816 002306  000261                      SEC                     ;SET C-BIT
817 002310  005200                  REG1A:  INC     R0              ;INCREMENT COUNTER
818 002312  001405                          BEQ     R1ERR           ;BR TO ERROR HALT IF COUNTER=0
819 002314  006101                          ROL     R1              ;ROTATE 1 POSITION
820 002316  103774                          BCS     REG1A           ;CONTINUE UNTIL C-BIT IS CLEAR
821 002320  022701  177777              CMP     #-1,R1          ;CHECK DATA IN R1
822 002324  001406                      BEQ     TST21
                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                        ;           WHICH FOLLOWS W/ 763           <====
002326
002326  012762  000024  177776  R1ERR:  MOV     #24,-2(R2)      ;MOVE TO MAILBOX #  *******  24  *******
002334  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
002340  000000                          HALT                    ;FAILURE WITH R1
                                        ;  OR SEQUENCE ERROR
```

```
823                                     .SBTTL  TEST # 21 - TEST IF R2 CAN HOLD A ONE IN ALL BITS
                                        ;*************************************************************************
                                        ;TEST 21 - TEST IF R2 CAN HOLD A ONE IN ALL BITS
                                        ;*************************************************************************
    002342  005212                      TST21:  INC     (R2)            ;UPDATE TEST NUMBER
    002344  022712  000021              CMP     #21,(R2)        ;SEQUENCE ERROR?
    002350  001014                      BNE     REG2A-14                ;BR TO ERROR HALT ON SEQ ERROR
824 002352  012702  000001              MOV     #1,R2           ;SET BIT 0
825 002356  012700  177757              MOV     #-21,R0         ;SET BIT COUNTER
826 002362  000241                      CLC                     ;CLEAR C-BIT
827 002364  005200                      REG2:   INC     R0              ;INCREMENT BIT COUNTER
828 002366  001405                      BEQ     REG2A-14        ;BR TO ERROR HALT IF BIT IS LOST
829 002370  006102                      ROL     R2              ;ROTATE 1 POSITION
830 002372  103374                      BCC     REG2            ;ALL DONE
831 002374  001410                      BEQ     REG2A
832                                                             ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
833                                                             ;           BRANCH INSTRUCTION AND         <====
834                                                             ;           REPLACE THE MOVE INSTRUCTION   <====
835                                                             ;           FOLLOWING W/ 771               <====
836 002376  012702  000304              MOV     #$TESTN,R2      ;RESTORE POINTER
837 002402  012762  000025  177776      MOV     #25,-2(R2)      ;MOVE TO MAILBOX #  *******  25  *******
    002410  005262  177774              INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
    002414  000000                      HALT                    ;FAILURE WITH R2
838 002416  012702  000304              REG2A:  MOV     #$TESTN,R2              ;RESTORE POINTER
839
```

```
840                                     .SBTTL  TEST # 22 - TEST IF R2 CAN HOLD A ZERO IN ALL BITS
                                        ;*************************************************************************
                                        ;TEST 22 - TEST IF R2 CAN HOLD A ZERO IN ALL BITS
                                        ;*************************************************************************
     002422  005212                     TST22:  INC     (R2)            ;UPDATE TEST NUMBER
     002424  022712  000022                     CMP     #22,(R2)        ;SEQUENCE ERROR?
     002430  001022                             BNE     TST23-10        ;BR TO ERROR HALT ON SEQ ERROR
841  002432  012702  177776                     MOV     #-2,R2          ;SET ALL ONES IN R2 EXCEPT FOR BIT 0
842  002436  012700  177757                     MOV     #-21,R0         ;SET BIT COUNTER
843  002442  000261                             SEC                     ;SET C-BIT
844  002444  005200                     REG2B:  INC     R0              ;INCREMENT BIT COUNTER
845  002446  001407                             BEQ     R2ERR           ;BR TO ERROR HALT IF COUNTER=0
846  002450  006102                             ROL     R2              ;ROTATE 1 POSITION
847  002452  103774                             BCS     REG2B           ;CONTINUE UNTIL C-BIT IS CLEAR
848  002454  022702  177777                     CMP     #-1,R2          ;CHECK DATA IN R2
849  002460  001410                             BEQ     REG2C
850  002462  012702  000304                     MOV     #$TESTN,R2      ;RESTORE POINTER
851  002466                             R2ERR:
     002466  012762  000026  177776             MOV     #26,-2(R2)      ;MOVE TO MAILBOX #  *******  26  *******
     002474  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     002500  000000                             HALT                    ;FAILURE WITH R2
852  002502  012702  000304            REG2C:  MOV     #$TESTN,R2      ;RESTORE POINTER
853
```

```
854                                     .SBTTL  TEST # 23 - TEST IF R3 CAN HOLD A ONE IN ALL BITS
                                        ;*************************************************************************
                                        ;TEST 23 - TEST IF R3 CAN HOLD A ONE IN ALL BITS
                                        ;*************************************************************************
                                        ;
     002506  005212                     TST23:  INC     (R2)            ;UPDATE TEST NUMBER
     002510  022712  000023                     CMP     #23,(R2)        ;SEQUENCE ERROR?
     002514  001014                             BNE     TST24-10        ;BR TO ERROR HALT ON SEQ ERROR
855  002516  012703  000001                     MOV     #1,R3           ;SET BIT 0
856  002522  012700  177757                     MOV     #-21,R0         ;SET BIT COUNTER
857  002526  000241                             CLC                     ;CLEAR C-BIT
858  002530  005200                     REG3:   INC     R0              ;INCREMENT BIT COUNTER
859  002532  001403                             BEQ     REG3E           ;BR TO ERROR HALT IF BIT IS LOST
860  002534  006103                             ROL     R3              ;ROTATE 1 POSITION
861  002536  103374                             BCC     REG3            ;ALL DONE
862  002540  001406                             BEQ     TST24
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 765           <====
     002542                             REG3E:
     002542  012762  000027  177776             MOV     #27,-2(R2)      ;MOVE TO MAILBOX #  *******  27  *******
     002550  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     002554  000000                             HALT                    ;FAILURE WITH R3
                                                                        ;  OR SEQUENCE ERROR
863
```

TEST # 24 - TEST IF R3 CAN HOLD A ZERO IN ALL BITS

```
864                                     .SBTTL  TEST # 24 - TEST IF R3 CAN HOLD A ZERO IN ALL BITS
                                        ;******************************************************************************
                                        ;TEST 24 - TEST IF R3 CAN HOLD A ZERO IN ALL BITS
                                        ;******************************************************************************
     002556  005212                     TST24:  INC     (R2)            ;UPDATE TEST NUMBER
     002560  022712  000024                     CMP     #24,(R2)        ;SEQUENCE ERROR?
     002564  001016                             BNE     TST25-10        ;BR TO ERROR HALT ON SEQ ERROR
865  002566  012703  177776                     MOV     #-2,R3          ;SET ALL'ONES IN R3 EXCEPT FOR BIT 0
866  002572  012700  177757                     MOV     #-21,R0         ;SET BIT COUNTER
867  002576  000261                             SEC                     ;SET C-BIT
868  002600  005200                     REG3A:  INC     R0              ;INCREMENT BIT COUNTER
869  002602  001405                             BEQ     R3ERR           ;BR TO ERROR HALT IF COUNTER=0
870  002604  006103                             ROL     R3              ;ROTATE 1 POSITION
871  002606  103774                             BCS     REG3A           ;CONTINUE UNTIL C-BIT IS CLEAR
872  002610  022703  177777                     CMP     #-1,R3          ;CHECK DATA
873  002614  001406                             BEQ     TST25
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 763           <====
     002616                             R3ERR:
     002616  012762  000030  177776             MOV     #30,-2(R2)      ;MOVE TO MAILBOX #  *******  30  *******
     002624  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     002630  000000                             HALT                    ;FAILURE WITH R3
                                                                        ;  OR SEQUENCE ERROR
874
```

TEST # 25 - TEST IF R4 CAN HOLD A ONE IN ALL BITS

```
875                                     .SBTTL  TEST # 25 - TEST IF R4 CAN HOLD A ONE IN ALL BITS
                                        ;*****************************************************************************
                                        ;TEST 25 - TEST IF R4 CAN HOLD A ONE IN ALL BITS
                                        ;*****************************************************************************
     002632  005212                     TST25:  INC     (R2)            ;UPDATE TEST NUMBER
     002634  022712  000025                     CMP     #25,(R2)        ;SEQUENCE ERROR?
     002640  001014                             BNE     TST26-10        ;BR TO ERROR HALT ON SEQ ERROR
876  002642  012704  000001                     MOV     #1,R4           ;SET BIT 0
877  002646  012700  177757                     MOV     #-21,R0         ;SET BIT COUNTER
878  002652  000241                             CLC                     ;CLEAR C-BIT
879  002654  005200                     REG4:   INC     R0              ;INCREMENT BIT COUNTER
880  002656  001403                             BEQ     REG4E           ;BR TO ERROR HALT IF BIT IS LOST
881  002660  006104                             ROL     R4              ;ROTATE 1 POSITION
882  002662  103374                             BCC     REG4            ;ALL DONE
883  002664  001406                             BEQ     TST26
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 765           <====
     002666                             REG4E:
     002666  012762  000031  177776             MOV     #31,-2(R2)      ;MOVE TO MAILBOX #  *******  31  *******
     002674  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     002700  000000                             HALT                    ;FAILURE WITH R4
                                                ;  OR SEQUENCE ERROR
884
```

```
885                                     .SBTTL  TEST # 26 - TEST IF R4 CAN HOLD A ZERO IN ALL BITS
                                        ;*****************************************************************************
                                        ;TEST 26 - TEST IF R4 CAN HOLD A ZERO IN ALL BITS
                                        ;*****************************************************************************
    002702  005212                      TST26:  INC     (R2)            ;UPDATE TEST NUMBER
    002704  022712  000026              CMP     #26,(R2)                ;SEQUENCE ERROR?
    002710  001016                      BNE     TST27-10                ;BR TO ERROR HALT ON SEQ ERROR
886 002712  012704  177776              MOV     #-2,R4                  ;SET ALL ONES IN R4 EXCEPT FOR BIT 0
887 002716  012700  177757              MOV     #-21,R0                 ;SET BIT COUNTER
888 002722  000261                      SEC                             ;SET C-BIT
889 002724  005200                      REG4A:  INC     R0              ;INCREMENT BIT COUNTER
890 002726  001405                      BEQ     R4ERR                   ;BR TO ERROR HALT IF COUNTER=0
891 002730  006104                      ROL     R4                      ;ROTATE 1 POSITION
892 002732  103774                      BCS     REG4A                   ;CONTINUE UNTIL C-BIT IS CLEAR
893 002734  022704  177777              CMP     #-1,R4                  ;CHECK DATA
894 002740  001406                      BEQ     TST27
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 763            <====
    002742                              R4ERR:
    002742  012762  000032  177776      MOV     #32,-2(R2)              ;MOVE TO MAILBOX #  *******  32  *******
    002750  005262  177774              INC     -4(R2)                  ;SET MSGTYP TO FATAL ERROR
    002754  000000                      HALT                            ;FAILURE WITH R4
                                                                        ;  OR SEQUENCE ERROR
895
896
```

TEST # 27 - TEST IF R5 CAN HOLD A ONE IN ALL BITS

```
897                                     .SBTTL  TEST # 27 - TEST IF R5 CAN HOLD A ONE IN ALL BITS
                                        ;*****************************************************************************
                                        ;TEST 27 - TEST IF R5 CAN HOLD A ONE IN ALL BITS
                                        ;*****************************************************************************
002756  005212                        TST27:  INC     (R2)            ;UPDATE TEST NUMBER
002760  022712  000027                        CMP     #27,(R2)        ;SEQUENCE ERROR?
002764  001014                                BNE     TST30-10        ;BR TO ERROR HALT ON SEQ ERROR
898 002766  012705  000001                    MOV     #1,R5           ;SET BIT 0
899 002772  012700  177757                    MOV     #-21,R0         ;SET BIT COUNTER
900 002776  000241                            CLC                     ;CLEAR C-BIT
901 003000  005200                  REG5:     INC     R0              ;INCREMENT BIT COUNTER
902 003002  001403                            BEQ     REG5E           ;BR TO ERROR HALT IF BIT IS LOST
903 003004  006105                            ROL     R5              ;ROTATE 1 POSITION
904 003006  103374                            BCC     REG5            ;ALL DONE
905 003010  001406                            BEQ     TST30
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                      ;           WHICH FOLLOWS W/ 765           <====
003012                              REG5E:
003012  012762  000033  177776                MOV     #33,-2(R2)      ;MOVE TO MAILBOX #  *******  33  *******
003020  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
003024  000000                                HALT                    ;FAILURE WITH R5
                                                                      ;  OR SEQUENCE ERROR
906
```

TEST # 30 - TEST IF R5 CAN HOLD A ZERO IN ALL BITS

```
907                                     .SBTTL  TEST # 30 - TEST IF R5 CAN HOLD A ZERO IN ALL BITS
                                        ;*****************************************************************************
                                        ;TEST 30 - TEST IF R5 CAN HOLD A ZERO IN ALL BITS
                                        ;*****************************************************************************
003026  005212                          TST30:  INC     (R2)            ;UPDATE TEST NUMBER
003030  022712  000030                          CMP     #30,(R2)        ;SEQUENCE ERROR?
003034  001016                                  BNE     TST31-10        ;BR TO ERROR HALT ON SEQ ERROR
908 003036  012705  177776                      MOV     #-2,R5          ;SET ALL ONES IN R5 EXCEPT FOR BIT 0
909 003042  012700  177757                      MOV     #-21,R0         ;SET BIT COUNTER
910 003046  000261                              SEC                     ;SET C-BIT
911 003050  005200                      REG5A:  INC     R0              ;INCREMENT BIT COUNTER
912 003052  001405                              BEQ     R5ERR           ;BR TO ERROR HALT IF COUNTER=0
913 003054  006105                              ROL     R5              ;ROTATE 1 POSITION
914 003056  103774                              BCS     REG5A           ;CONTINUE UNTIL C-BIT IS C;EAR
915 003060  022705  177777                      CMP     #-1,R5          ;CHECK DATA
916 003064  001406                              BEQ     TST31
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 763           <====
003066                                  R5ERR:
003066  012762  000034  177776                  MOV     #34,-2(R2)      ;MOVE TO MAILBOX #  *******  34  *******
003074  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
003100  000000                                  HALT                    ;FAILURE WITH R5
                                                                        ;  OR SEQUENCE ERROR
917
```

TEST # 31 - TEST IF R6 CAN HOLD A ONE IN ALL BITS

```
                                .SBTTL  TEST # 31 - TEST IF R6 CAN HOLD A ONE IN ALL BITS
                                ;*****************************************************************************
                                ;TEST 31 - TEST IF R6 CAN HOLD A ONE IN ALL BITS
                                ;*****************************************************************************
003102  005212                  TST31:  INC     (R2)            ;UPDATE TEST NUMBER
003104  022712  000031                  CMP     #31,(R2)        ;SEQUENCE ERROR?
003110  001014                          BNE     TST32-10        ;BR TO ERROR HALT ON SEQ ERROR
003112  012706  000001                  MOV     #1,R6           ;SET BIT 0
003116  012700  177757                  MOV     #-21,R0         ;SET BIT COUNTER
003122  000241                          CLC                     ;CLEAR C-BIT
003124  005200                  REG6:   INC     R0              ;INCREMENT BIT COUNTER
003126  001403                          BEQ     REG6E           ;BR TO ERROR HALT IF BIT IS LOST
003130  006106                          ROL     R6              ;ROTATE 1 POSITION
003132  103374                          BCC     REG6            ;ALL DONE
003134  001406                          BEQ     TST32
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 765           <====
003136                          REG6E:
003136  012762  000035  177776          MOV     #35,-2(R2)      ;MOVE TO MAILBOX #  *******  35  *******
003144  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
003150  000000                          HALT                    ;FAILURE WITH R6
                                                                ;  OR SEQUENCE ERROR
```

```
 928                                    .SBTTL  TEST # 32 - TEST IF R6 CAN HOLD A ZERO IN ALL BITS
                                        ;*****************************************************************************
                                        ;TEST 32 - TEST IF R6 CAN HOLD A ZERO IN ALL BITS
                                        ;*****************************************************************************
 003152  005212                        TST32:  INC     (R2)            ;UPDATE TEST NUMBER
 003154  022712  000032                        CMP     #32,(R2)        ;SEQUENCE ERROR?
 003160  001016                                BNE     TST33-10        ;BR TO ERROR HALT ON SEQ ERROR
 929 003162  012706  177776                    MOV     #-2,R6          ;SET ALL ONES IN R6 EXCEPT FOR BIT 0
 930 003166  012700  177757                    MOV     #-21,R0         ;SET BIT COUNTER
 931 003172  000261                            SEC                     ;SET C-BIT
 932 003174  005200                    REG6A:  INC     R0              ;INCREMENT BIT COUNT
 933 003176  001405                            BEQ     R6ERR           ;BR TO ERROR HALT IF COUNTER=0
 934 003200  006106                            ROL     R6              ;ROTATE 1 POSITION
 935 003202  103774                            BCS     REG6A           ;CONTINUE UNTIL C-BIT IS CLEAR
 936 003204  022706  177777                    CMP     #-1,R6          ;CHECK DATA
 937 003210  001406                            BEQ     TST33
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 763           <====
 003212                                 R6ERR:
 003212  012762  000036  177776                MOV     #36,-2(R2)      ;MOVE TO MAILBOX #  *******  36  *******
 003220  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 003224  000000                                HALT                    ;FAILURE WITH R6
                                                                       ;  OR SEQUENCE ERROR
 938
 939                                    ;*****************************************************************************
 940                                    .SBTTL  PSW TESTS
 941                                    ;
 942                                    ;       THE PSW TESTS ARE USED TO VERIFY THAT VARIOUS DATA
 943                                    ;PATTERNS CAN BE SUCCESSFULLY HELD IN THE PSW AND THAT THE
 944                                    ;PSW ADDRESSING LOGIC IS FUNCTIONING.  MOVE AND COMPARE INSTRUCTIONS
 945                                    ;ARE USED TO TEST THAT THE PSW CAN HOLD VARIOUS DATA PATTERNS.
 946                                    ;EACH DATA PATTERN IS MOVED AND TESTED IN A SMALL LOOP CONVENIENT FOR
 947                                    ;SCOPING.
 948                                    ;       THE PSW REGISTER ITSELF IS TESTED AS WELL AS THE ADDRESS
 949                                    ;SELECT CIRCUITRY.  THE AMUX INPUTS TO THE PSW MUX ARE TESTED.  THE
 950                                    ;CC INPUTS ARE TESTED LATER IN THE MICROCODE TESTS.  SETTING OF
 951                                    ;THE T-BIT BY THE TEST PATTERNS IS PURPOSELY AVOIDED; TESTING OF THE
 952                                    ;T-BIT TRAP CIRCUITRY IS LEFT FOR THE TRAP TEST.
 953                                    ;
```

TEST # 33 - TEST IF PSW WILL HOLD ZEROES

```
954                                     .SBTTL  TEST # 33 - TEST IF PSW WILL HOLD ZEROES
                                        ;*****************************************************************************
                                        ;TEST 33 - TEST IF PSW WILL HOLD ZEROES
                                        ;*****************************************************************************
    003226  005212                      TST33:  INC     (R2)            ;UPDATE TEST NUMBER
    003230  022712  000033              CMP     #33,(R2)        ;SEQUENCE ERROR?
    003234  001012                      BNE     TST34-10        ;BR TO ERROR HALT ON SEQ ERROR
955 003236  012706  001000              MOV     #STBOT,R6
956 003242  012737  000000  177776      MOV     #0,@#PS         ;SET PSW TO ZERO
957 003250  005737  177776              TST     @#PS            ;SUCCESSFUL
958 003254  001406                      BEQ     TST34
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 767           <====
    003256  012762  000037  177776      MOV     #37,-2(R2)      ;MOVE TO MAILBOX #  *******  37  *******
    003264  005262  177774              INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
    003270  000000                      HALT                    ;PSW NOT 0
                                                                ;  OR SEQUENCE ERROR
959
```

```
960                                     .SBTTL  TEST # 34 - TEST IF PSW WILL HOLD ONES AND ZEROES
                                        ;*************************************************************************
                                        ;TEST 34 - TEST IF PSW WILL HOLD ONES AND ZEROES
                                        ;*************************************************************************
     003272  005212                     TST34:  INC     (R2)            ;UPDATE TEST NUMBER
     003274  022712  000034                     CMP     #34,(R2)        ;SEQUENCE ERROR?
     003300  001011                             BNE     TST35-10        ;BR TO ERROR HALT ON SEQ ERROR
961  003302  012737  000252  177776             MOV     #252,@#PS       ;MOVE ALT. ONES AND ZEROES TO PSW
962  003310  023727  177776  000252             CMP     @#PS,#252       ;SUCCESSFUL?
963  003316  001406                             BEQ     TST35
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <=-==
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <=-==
                                                                        ;           WHICH FOLLOWS W/ 770           <====
     003320  012762  000040  177776             MOV     #40,-2(R2)      ;MOVE TO MAILBOX #  *******  40  *******
     003326  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     003332  000000                             HALT                    ;PSW NOT 252
                                                                        ;  OR SEQUENCE ERROR
964
```

```
965                                     .SBTTL  TEST # 35 - TEST IF PSW (EXCEPT T-BIT) WILL HOLD 0'S & 1'S
                                        ;*****************************************************************************
                                        ;TEST 35 - TEST IF PSW (EXCEPT T-BIT) WILL HOLD 0'S & 1'S
                                        ;*****************************************************************************
                                        ;
003334  005212                          TST35:  INC     (R2)            ;UPDATE TEST NUMBER
003336  022712  000035                          CMP     #35,(R2)        ;SEQUENCE ERROR?
003342  001011                          BNE     TST36-10        ;BR TO ERROR HALT ON SEQ ERROR
966 003344  012737  000105  177776      MOV     #105,@#PS       ;MOVE ALT. ONES AND ZEROES TO PSW
967 003352  023727  177776  000105      CMP     @#PS,#105       ;SUCCESSFUL?
968 003360  001406                      BEQ     TST36
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 770           <====
003362  012762  000041  177776          MOV     #41,-2(R2)      ;MOVE TO MAILBOX #  *******  41  *******
003370  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
003374  000000                          HALT                    ;PSW NOT 105
                                                                ;  OR SEQUENCE ERROR
969
```

TEST # 36 - TEST IF PSW (EXCEPT T-BIT) WILL HOLD ALL ONES

```
                                        .SBTTL  TEST # 36 - TEST IF PSW (EXCEPT T-BIT) WILL HOLD ALL ONES
                                        ;*****************************************************************************
                                        ;TEST 36 - TEST IF PSW (EXCEPT T-BIT) WILL HOLD ALL ONES
                                        ;*****************************************************************************
003376  005212                  TST36:  INC     (R2)            ;UPDATE TEST NUMBER
003400  022712  000036                  CMP     #36,(R2)        ;SEQUENCE ERROR?
003404  001011                          BNE     TST37-10        ;BR TO ERROR HALT ON SEQ ERROR
971 003406  012737  000357  177776      MOV     #357,@#PS       ;MOVE ONES TO PSW
972 003414  023727  177776  000357      CMP     @#PS,#357       ;SUCCESSFUL
973 003422  001406                      BEQ     TST37
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 770           <====
003424  012762  000042  177776          MOV     #42,-2(R2)      ;MOVE TO MAILBOX #  *******  42  *******
003432  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
003436  000000                          HALT                    ;PSW NOT 357
                                                                ;  OR SEQUENCE ERROR
974                                     .SBTTL  CONDITION CODE TEST
975
976                                     ;*****************************************************************************
977                                     ;
978                                     ;       THIS TEST CHECKS THE CONDITIONAL BRANCHES INVOLVING THE Z-BIT.
979                                     ;THE Z-BIT IS SET WITH ALL OTHER CC BITS ZERO AND BOTH CONDITIONS
980                                     ;BEQ AND BNE ARE TESTED FOR PROPER EXECUTION.  THEN THE Z-BIT IS
981                                     ;SET WITH ALL OTHER CC BITS CLEAR AND BOTH CONDITIONS ARE TESTED
982                                     ;AGAIN FOR PROPER OPERATION.
983                                     ;       THIS TEST CHECKS THE OPERATION OF THE SET AND CLEAR CONDITION
984                                     ;CODE INSTRUCTIONS AND CHECKS THE CIRCUITRY EXTERNAL TO THE CONDITIONAL
985                                     ;BRANCH ROM.  THE BRANCH MICROCODE FOR ALTERING THE PC AND FOR
986                                     ;LEAVING THE PC UNALTERED IS TESTED.  ONLY THOSE ROM ADDRESSES SPECIFICALLY
987                                     ;USED IN THE TEST ARE VERIFIED HERE.
988                                     ;
```

```
 989                                    .SBTTL  TEST # 37 - TEST BRANCHES AROUND Z-BIT
                                        ;******************************************************************************
                                        ;TEST 37 - TEST BRANCHES AROUND Z-BIT
                                        ;******************************************************************************
 003440  005212                         TST37:  INC     (R2)            ;UPDATE TEST NUMBER
 003442  022712  000037                         CMP     #37,(R2)        ;SEQUENCE ERROR?
 003446  001020                                 BNE     TST40-10        ;BR TO ERROR HALT ON SEQ ERROR
 990                                            ;FIRST WITH Z-BIT ON
 991 003450  000257                             CCC                     ;CC=0100: JUST Z-BIT
 992 003452  000264                             SEZ
 993 003454  001001                             BNE     BRZ1            ;CHECK OPPOSITE CONDITION
 994 003456  001406                             BEQ     BRZ2
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 773           <====
 003460                                 BRZ1:
 003460  012762  000043  177776                 MOV     #43,-2(R2)      ;MOVE TO MAILBOX #  *******  43  *******
 003466  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 003472  000000                                 HALT                    ;IMPROPER BR W/ Z=1
 995                                            ;CHECK WITH Z-BIT OFF
 996 003474  000277                     BRZ2:   SCC                     ;CC=1011: ALL BUT Z-BIT
 997 003476  000244                             CLZ
 998 003500  001401                             BEQ     BRZ3
 999 003502  001006                             BNE     TST40
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 761           <====
 003504                                 BRZ3:
 003504  012762  000044  177776                 MOV     #44,-2(R2)      ;MOVE TO MAILBOX #  *******  44  *******
 003512  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 003516  000000                                 HALT                    ;IMPROPER BR W/ Z=0
                                                                        ;  OR SEQUENCE ERROR
1000
1001                                    ;******************************************************************************
1002                                    ;
1003                                    ;       THIS TEST CHECKS THE CONDITIONAL BRANCHES INVOLVING THE N-BIT.
1004                                    ;THE N-BIT IS SET WITH ALL OTHER CC BITS ZERO AND BOTH CONDITIONS
1005                                    ;BMI AND BPL ARE TESTED FOR PROPER EXECUTION.  THEN THE N-BIT IS
1006                                    ;SET WITH ALL OTHER CC BITS CLEAR AND BOTH CONDITIONS ARE TESTED
1007                                    ;AGAIN FOR PROPER OPERATION.
1008                                    ;       THIS TEST CHECKS THE OPERATION OF THE SET AND CLEAR CONDITION
1009                                    ;CODE INSTRUCTIONS AND CHECKS THE CIRCUITRY EXTERNAL TO THE CONDITIONAL
1010                                    ;BRANCH ROM.  THE BRANCH MICROCODE FOR ALTERING THE PC AND FOR
1011                                    ;LEAVING THE PC UNALTERED IS TESTED.  ONLY THOSE ROM ADDRESSES SPECIFICALLY
1012                                    ;USED IN THE TEST ARE VERIFIED HERE.
1013                                    ;
```

```
1014                                    .SBTTL  TEST # 40 - TEST BRANCHES AROUND N-BIT
                                        ;*************************************************************************
                                        ;TEST 40 - TEST BRANCHES AROUND N-BIT
                                        ;*************************************************************************
003520  005212                          TST40:  INC     (R2)            ;UPDATE TEST NUMBER
003522  022712  000040                          CMP     #40,(R2)        ;SEQUENCE ERROR?
003526  001020                                  BNE     TST41-10        ;BR TO ERROR HALT ON SEQ ERROR
1015                                            ;FIRST WITH N-BIT ON
1016 003530  000257                             CCC                     ;CC=1000: JUST N-BIT
1017 003532  000270                             SEN
1018 003534  100001                             BPL     BRN1            ;CHECK OPPOSITE CONDITION
1019 003536  100406                             BMI     BRN2
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 773           <====
003540                                  BRN1:
003540  012762  000045  177776                  MOV     #45,-2(R2)      ;MOVE TO MAILBOX #  *******  45  *******
003546  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
003552  000000                                  HALT                    ;IMPROPER BR W/ N=1
1020                                            ;CHECK WITH N-BIT OFF
1021 003554  000277                     BRN2:   SCC                     ;CC=0111
1022 003556  000250                             CLN
1023 003560  100401                             BMI     BRN3            ;CHECK OPPOSITE CONDITION
1024 003562  100006                             BPL     TST41
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 761           <====
003564                                  BRN3:
003564  012762  000046  177776                  MOV     #46,-2(R2)      ;MOVE TO MAILBOX #  *******  46  *******
003572  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
003576  000000                                  HALT                    ;IMPROPER BR W/ N=0
                                                ;  OR SEQUENCE ERROR
1025
1026                                    ;*************************************************************************
1027                                    ;
1028                                    ;       THIS TEST CHECKS THE CONDITIONAL BRANCHES INVOLVING THE V-BIT.
1029                                    ;THE V-BIT IS SET WITH ALL OTHER CC BITS ZERO AND BOTH CONDITIONS
1030                                    ;BVS AND BVC ARE TESTED FOR PROPER EXECUTION.  THEN THE V-BIT IS
1031                                    ;SET WITH ALL OTHER CC BITS CLEAR AND BOTH CONDITIONS ARE TESTED
1032                                    ;AGAIN FOR PROPER OPERATION.
1033                                    ;       THIS TEST CHECKS THE OPERATION OF THE SET AND CLEAR CONDITION
1034                                    ;CODE INSTRUCTIONS AND CHECKS THE CIRCUITRY EXTERNAL TO THE CONDITIONAL
1035                                    ;BRANCH ROM.  THE BRANCH MICROCODE FOR ALTERING THE PC AND FOR
1036                                    ;LEAVING THE PC UNALTERED IS TESTED.  ONLY THOSE ROM ADDRESSES SPECIFICALLY
1037                                    ;USED IN THE TEST ARE VERIFIED HERE.
1038                                    ;
```

```
1039                                    .SBTTL  TEST # 41 - TEST BRANCHES AROUND V-BIT
                                        ;*****************************************************************************
                                        ;TEST 41 - TEST BRANCHES AROUND V-BIT
                                        ;*****************************************************************************
003600  005212                          TST41:  INC     (R2)            ;UPDATE TEST NUMBER
003602  022712  000041                         CMP     #41,(R2)        ;SEQUENCE ERROR?
003606  001020                                 BNE     TST42-10        ;BR TO ERROR HALT ON SEQ ERROR
1040                                            ;FIRST WITH V-BIT ON
1041 003610  000257                            CCC                     ;CC=0010: JUST V-BIT
1042 003612  000262                            SEV
1043 003614  102001                            BVC     BRV1            ;CHECK OPPOSITE CONDITION
1044 003616  102406                            BVS     BRV2
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 773           <====
003620                                  BRV1:
003620  012762  000047  177776                  MOV     #47,-2(R2)      ;MOVE TO MAILBOX #  *******  47  *******
003626  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
003632  000000                                 HALT                    ;IMPROPER BR W/ V=1
1045                                            ;CHECK WITH V-BIT OFF
1046 003634  000277                    BRV2:   SCC                     ;CC=1101: ALL BVT V-BIT
1047 003636  000242                            CLV
1048 003640  102401                            BVS     BRV3            ;CHECK OPPOSITE CONDITION
1049 003642  102006                            BVC     TST42
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 761           <====
003644                                  BRV3:
003644  012762  000050  177776                  MOV     #50,-2(R2)      ;MOVE TO MAILBOX #  *******  50  *******
003652  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
003656  000000                                 HALT                    ;IMPROPER BR W/ V=0
                                                ;  OR SEQUENCE ERROR
1050
1051                                    ;*****************************************************************************
1052                                    ;
1053                                    ;       THIS TEST CHECKS THE CONDITIONAL BRANCHES INVOLVING THE C-BIT.
1054                                    ;THE C-BIT IS SET WITH ALL OTHER CC BITS ZERO AND BOTH CONDITIONS
1055                                    ;BCS AND BCC ARE TESTED FOR PROPER EXECUTION.  THEN THE C-BIT IS
1056                                    ;SET WITH ALL OTHER CC BITS CLEAR AND BOTH CONDITIONS ARE TESTED
1057                                    ;AGAIN FOR PROPER OPERATION.
1058                                    ;       THIS TEST CHECKS THE OPERATION OF THE SET AND CLEAR CONDITION
1059                                    ;CODE INSTRUCTIONS AND CHECKS THE CIRCUITRY EXTERNAL TO THE CONDITIONAL
1060                                    ;BRANCH ROM.  THE BRANCH MICROCODE FOR ALTERING THE PC AND FOR
1061                                    ;LEAVING THE PC UNALTERED IS TESTED.  ONLY THOSE ROM ADDRESSES SPECIFICALLY
1062                                    ;USED IN THE TEST ARE VERIFIED HERE.
1063                                    ;
```

```
1064                                    .SBTTL  TEST # 42 - TEST BRANCHES AROUND C-BIT
                                        ;*****************************************************************************
                                        ;TEST 42 - TEST BRANCHES AROUND C-BIT
                                        ;*****************************************************************************
003660  005212                          TST42:  INC     (R2)            ;UPDATE TEST NUMBER
003662  022712  000042                          CMP     #42,(R2)        ;SEQUENCE ERROR?
003666  001020                                  BNE     TST43-10        ;BR TO ERROR HALT ON SEQ ERROR
1065                                            ;FIRST WITH C-BIT ON
1066 003670  000257                             CCC                     ;CC=0001: JUST C-BIT
1067 003672  000261                             SEC
1068 003674  103001                             BCC     BRC1            ;CHECK OPPOSITE CONDITION
1069 003676  103406                             BCS     BRC2
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 773           <====
003700                                  BRC1:
003700  012762  000051  177776                  MOV     #51,-2(R2)      ;MOVE TO MAILBOX #  *******  51  *******
003706  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
003712  000000                                  HALT                    ;IMPROPER BR W/ C=1
1070                                            ;CHECK WITH C-BIT OFF
1071 003714  000277                     BRC2:   SCC                     ;CC=1110
1072 003716  000241                             CLC
1073 003720  103401                             BCS     BRC3            ;CHECK OPPOSITE CONDITION
1074 003722  100406                             BMI     TST43
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 761           <====
003724                                  BRC3:
003724  012762  000052  177776                  MOV     #52,-2(R2)      ;MOVE TO MAILBOX #  *******  52  *******
003732  005262  177774                          INC     -4(R2)          ;SET MSGTYF TO FATAL ERROR
003736  000000                                  HALT                    ;IMPROPER BR W/ C=0
                                                ;  OR SEQUENCE ERROR
1075
1076                                    ;*****************************************************************************
1077                                    .SBTTL  MICROCODE TESTS
1078                                    ;
1079                                    ;       THE MICROCODE TESTS ARE USED TO VERIFY THE MICROPROGRAMM
1080                                    ;FLOW.  THE GOAL OF THESE TESTS IS TO EXERCISE EVERY POSSIBLE
1081                                    ;BRANCH IN THE MICROPROGRAM FLOW.
1082                                    ;       THE TEST EXERCISES EVERY BRANCH IN THE MICROCODE BY
1083                                    ;TESTING AT LEAST ONE INSTRUCTION FROM EVERY CLASS OF INSTRUCTION IN
1084                                    ;ALL POSSIBLE MODES.  FOR EXAMPLE, TO TEST THE SINGLE OPERAND INSTRUCTIONS,
1085                                    ;AT LEAST ONE SINGLE OPERAND INSTRUCTION IS VERIFIED IN ALL UNIQUE
1086                                    ;ADDRESSING MODES.  BYTE MODES ARE ALSO TESTED.  AS EACH NEW
1087                                    ;MODE IS INTRODUCED THE SAME INSTRUCTION IS TRIED AND TESTED IN
1088                                    ;A SMALL LOOP CONVENIENT FOR SCOPING.  THE TEST IS SET UP USING
1089                                    ;ONLY INSTRUCTIONS AND ADDRESSING MODES WHICH HAVE BEEN PREVIOUSLY
1090                                    ;VERIFIED.
1091                                    ;       IF THESE TESTS FAIL, CHECK THE RESULTS FOR A CLUE TO THE
1092                                    ;FAULT.
1093                                    ;
1094                                    ;*****************************************************************************
1095
1096
1097
```

```
1098                    ;*****************************************************************************************
1099                    ;
1100                    ;       THE CLR INSTRUCTION IS USED TO INTRODUCE EACH ADDRESSING
1101                    ;MODE WITH THE SINGLE OPERAND INSTRUCTION.  FOLLOWING THE SEQUENCE CHECK,
1102                    ;THE CLR INSTRUCTION IS EXECUTED AND A BRANCH TEST IS EXECUTED WHICH
1103                    ;CHECKS THAT THE Z-BIT WAS PROPERLY SET.  THIS SMALL TEST IS SELF-SUFFICIENT
1104                    ;AND CAN BE SCOPED TO TROUBLE SHOOT ALL OF THE IR DECODE LOGIC AND
1105                    ;MICROCODE FOR SOP INSTRUCTIONS WITH MODE 0.  FOLLOWING THIS TEST
1106                    ;SEVERAL OTHER SOP INSTRUCTIONS ARE INTRODUCED WITH MODE 0.  THESE
1107                    ;INSTRUCTIONS MAINPULATE DATA AND SERVE TO CHECK THE DATA RESULTS
1108                    ;OF THE SOP INSTRUCTIONS IN THIS TEST.  THE DATA IN THIS TEST IS
1109                    ;OPERATED ON BY EACH INSTRUCTION WITHOUT REINITIALIZING.
1110                    ;
```

```
1111                                    .SBTTL  TEST # 43 - TEST MODE 0 USING SOP INST.
                                        ;*************************************************************************
                                        ;TEST 43 - TEST MODE 0 USING SOP INST.
                                        ;*************************************************************************
                                        ;
003740  005212                  TST43:  INC     (R2)            ;UPDATE TEST NUMBER
003742  022712  000043                  CMP     #43,(R2)        ;SEQUENCE ERROR?
003746  001026                          BNE     TST44-10        ;BR TO ERROR HALT ON SEQ ERROR
1112 003750  005000                     CLR     R0              ;TRY THE CLEAR INST.
1113 003752  001406                     BEQ     SOP0A
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 775           <====
003754  012762  000053  177776          MOV     #53,-2(R2)      ;MOVE TO MAILBOX #  *******  53  *******
003762  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
003766  000000                          HALT                    ;CLR DID NOT SET Z-BIT
1114 003770  005200             SOP0A:  INC     R0              ;TRY THE INCREMENT INST.
1115 003772  005100                     COM     R0              ;TRY COMPLEMENT
1116 003774  005200                     INC     R0
1117 003776  100406                     BMI     SOP0B
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 763           <====
004000  012762  000054  177776          MOV     #54,-2(R2)      ;MOVE TO MAILBOX #  *******  54  *******
004006  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
004012  000000                          HALT                    ;NEGATE DID NOT SET N-BIT
1118 004014  005100             SOP0B:  COM     R0              ;TRY COMPLEMENT INST.
1119 004016  001406                     BEQ     TST44
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 753           <====
004020  012762  000055  177776          MOV     #55,-2(R2)      ;MOVE TO MAILBOX #  *******  55  *******
004026  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
004032  000000                          HALT                    ;CUMMULATIVE RESULT OF CLR,INC,NEG AND COM INSTS. FAILED
                                                                ;  OR SEQUENCE ERROR
1120
1121
1122                                    ;*************************************************************************
1123                                    ;
1124                                    ;       THIS TEST INTRODUCES THE REMAINING SOP INSTRUCIONS AND TESTS
1125                                    ;THEM IN MODE 0.  THE PURPOSE IS TO PROVIDE A BASELINE OF
1126                                    ;INSTRUCTIONS FOR USE IN THE SUBSEQUENT TESTS.  SINCE THE MICROCODE FOR
1127                                    ;THESE INSTRUCTIONS IS IDENTICAL TO THAT ALREADY TESTED, ANY TROUBLE
1128                                    ;SHOOTING EFFORTS SHOULD BE AIMED AT THE ACTUAL IR DECODE AND ALU
1129                                    ;FUNCTIONING.
1130                                    ;
```

TEST # 44 - TEST REMAINDER OF SOP INSTS IN MODE 0

```
1131                                    .SBTTL  TEST # 44 - TEST REMAINDER OF SOP INSTS IN MODE 0
                                        ;*****************************************************************************
                                        ;TEST 44 - TEST REMAINDER OF SOP INSTS IN MODE 0
                                        ;*****************************************************************************
004034  005212                          TST44:  INC     (R2)            ;UPDATE TEST NUMBER
004036  022712  000044                          CMP     #44,(R2)        ;SEQUENCE ERROR?
004042  001025                                  BNE     TST45-10        ;BR TO ERROR HALT ON SEQ ERROR
1132 004044  005000                             CLR     R0              ;INITIALIZE
1133 004046  005300                             DEC     R0              ;TRY DECREMENT INST.
1134 004050  100406                             BMI     SOPOC
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 774           <====
004052  012762  000056  177776                  MOV     #56,-2(R2)      ;MOVE TO MAILBOX #  *******  56  *******
004060  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
004064  000000                                  HALT                    ;N-BIT NOT SET ON DEC
1135 004066  000261                     SOPOC:  SEC                     ;INITIALIZE CARRY
1136 004070  005500                             ADC     R0              ;TRY ADD CARRY INST
1137 004072  001007                             BNE     SOPOD
1138 004074  000261                             SEC                     ;INITIALIZE CARRY
1139 004076  005600                             SBC     R0              ;TRY SUBTRACT-CARRY INST
1140 004100  100004                             BPL     SOPOD
1141 004102  005100                             COM     R0
1142 004104  005200                             INC     R0
1143 004106  005300                             DEC     R0
1144 004110  001406                             BEQ     TST45
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 754           <====
004112                                  SOPOD:
004112  012762  000057  177776                  MOV     #57,-2(R2)      ;MOVE TO MAILBOX #  *******  57  *******
004120  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
004124  000000                                  HALT                    ; CUMMULATIVE RESULT OF ADC,SBC,COM,INC AND DEC INSTS. FAILE
                                                                        ;  OR SEQUENCE ERROR
1145
1146                                    ;*****************************************************************************
1147                                    ;
1148                                    ;       THIS TEST INTRODUCES THE BYTE CONTROL LOGIC OF THE PROCESSOR.
1149                                    ;THE MODE 0 BYTE MICROCODE IS TESTED.  THE METHOD AND SEQUENCE
1150                                    ;OF TESTING IS THE SAME AS THAT USED IN THE SOP MODE 0 TESTS.
1151                                    ;
```

```
1152                                    .SBTTL  TEST # 45 - TEST MODE 0 EVEN BYTE USING SOP INST
                                        ;*****************************************************************************
                                        ;TEST 45 - TEST MODE 0 EVEN BYTE USING SOP INST
                                        ;*****************************************************************************
     004126  005212                     TST45:  INC     (R2)            ;UPDATE TEST NUMBER
     004130  022712  000045                     CMP     #45,(R2)        ;SEQUENCE ERROR?
     004134  001016                             BNE     TST46-10        ;BR TO ERROR HALT ON SEQ ERROR
1153 004136  105000                             CLRB    R0              ;TRY CLEARING EVEN BYTE OF REGISTER
1154 004140  001406                             BEQ     SOPB0A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 775           <====
     004142  012762  000060  177776             MOV     #60,-2(R2)      ;MOVE TO MAILBOX #  *******  60  *******
     004150  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     004154  000000                             HALT                    ;CLRB DID NOT SET Z-BIT
1155 004156  105100                     SOPB0A: COMB    R0              ;TRY SETTING EVEN BYTE OF REGISTER
1156 004160  100002                             BPL     SOPB0B
1157 004162  105200                             INCB    R0              ;TRY INCREMENTING EVEN BYTE OF REGISTER>>
1158 004164  001406                             BEQ     TST46
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 763           <====
     004166                             SOPB0B:
     004166  012762  000061  177776             MOV     #61,-2(R2)      ;MOVE TO MAILBOX #  *******  61  *******
     004174  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     004200  000000                             HALT                    ;TEST CUMMULATIVE RESULT OF ABOVE BYTE INST.
                                                                        ;  OR SEQUENCE ERROR
1159
1160                                    ;*****************************************************************************
1161                                    ;
1162                                    ;       THIS TEST USES THE CLR INSTRUCTION TO INTRODUCE AND TEST
1163                                    ;SINGLE OPERAND MODE 1 INSTRUCTIONS.  AGAIN, THE CLR INSTRUCTION
1164                                    ;IS USED TO INTRODUCE THE MICROCODE AND TO TEST THAT THE PROPER
1165                                    ;CONDITION CODES ARE SET.  OTHER SOP INSTRUCTIONS ARE USED TO MANIPULATE
1166                                    ;COMMON DATA TO VERIFY THAT THE CORRECT DATA IS PRODUCED.
1167                                    ;
```

```
1168                                    .SBTTL  TEST # 46 - TEST MODE 1 USING SOP INST.
                                        ;*****************************************************************************
                                        ;TEST 46 - TEST MODE 1 USING SOP INST.
                                        ;*****************************************************************************
004202  005212                        TST46:  INC     (R2)            ;UPDATE TEST NUMBER
004204  022712  000046                        CMP     #46,(R2)        ;SEQUENCE ERROR?
004210  001020                                BNE     TST47-10        ;BR TO ERROR HALT ON SEQ ERROR
1169 004212  005000                         CLR     R0              ;INITIALIZE R0
1170 004214  005010                         CLR     (R0)            ;TRY CLEAR INST W/MODE 1
1171 004216  001406                         BEQ     SOP1A
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 774           <====
004220  012762  000062  177776            MOV     #62,-2(R2)      ;MOVE TO MAILBOX #  *******  62  *******
004226  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
004232  000000                            HALT                    ;CLR DID NOT SET Z-BIT
1172 004234  005310                 SOP1A: DEC     (R0)            ;TRY DECREMENT INST W/MODE 1
1173 004236  100003                         BPL     SOP1B
1174 004240  000261                         SEC                     ;INITIALIZE CARRY
1175 004242  005510                         ADC     (R0)            ;TRY ADD-CARRY W/MODE 1
1176 004244  001406                         BEQ     TST47
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 761           <====
004246                              SOP1B:
004246  012762  000063  177776            MOV     #63,-2(R2)      ;MOVE TO MAILBOX #  *******  63  *******
004254  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
004260  000000                            HALT                    ;TEST CUMMULATIVE RESULT OF ABOVE INST
                                                                    ;  OR SEQUENCE ERROR
1177
1178                                    ;*****************************************************************************
1179                                    ;
1180                                    ;       THIS TEST VERIFIES THE BYTE INSTRUCTION MICROCODE FOR MODE 1
1181                                    ;SINGLE OPERAND INSTRUCTIONS.
1182                                    ;       THIS IS THE FIRST PLACE THE SIGN EXTEND LOGIC IS EXERCISED
1183                                    ;AND VERIFIED.
1184                                    ;
```

```
1185                                    .SBTTL  TEST # 47 - TEST MODE 1 EVEN BYTE USING SOP INST
                                        ;*************************************************************************
                                        ;TEST 47 - TEST MODE 1 EVEN BYTE USING SOP INST
                                        ;*************************************************************************
004262  005212                          TST47:  INC     (R2)            ;UPDATE TEST NUMBER
004264  022712  000047                          CMP     #47,(R2)        ;SEQUENCE ERROR?
004270  001024                                  BNE     TST50-10        ;BR TO ERROR HALT ON SEQ ERROR
1186 004272  005000                             CLR     R0              ;INITIALIZE R0
1187 004274  005010                             CLR     (R0)            ;INITIALIZE LOC. 0
1188 004276  005110                             COM     (R0)
1189 004300  105010                             CLRB    (R0)            ;TRY TO CLEAR BYTE 0
1190 004302  001406                             BEQ     SOPB1A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 772           <====
004304  012762  000064  177776                  MOV     #64,-2(R2)      ;MOVE TO MAILBOX #  *******  64  *******
004312  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
004316  000000                                  HALT                    ;CLRB DID NOT SET Z-BIT
1191 004320  005210                     SOPB1A: INC     (R0)            ;INCREMENT TO TEST WORD
1192 004322  100005                             BPL     SOPB1B
1193 004324  105110                             COMB    (R0)            ;COMPLEMENT:  ODD BYTE = 376
1194 004326  105210                             INCB    (R0)            ;INC:  ODD BYTE = 377
1195 004330  100002                             BPL     SOPB1B
1196 004332  105210                             INCB    (R0)            ;INCREMENT ODD BYTE=0
1197 004334  001406                             BEQ     TST50
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 755           <====
004336                                  SOPB1B:
004336  012762  000065  177776                  MOV     #65,-2(R2)      ;MOVE TO MAILBOX #  *******  65  *******
004344  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
004350  000000                                  HALT                    ;CHECK CUMMULATIVE RESULT OF ABOVE INST
                                                                        ;  OR SEQUENCE ERROR
1198
1199
1200                                    ;*************************************************************************
1201                                    ;
1202                                    ;       THIS TEST VERIFIES THAT SINGLE OPERAND BYTE INSTRUCTIONS WILL
1203                                    ;FUNCTION CORRECTLY FOR ODD BYTES.
1204                                    ;       THIS IS THE FIRST TIME THAT ADDRESS LINE 0 HAS BEEN
1205                                    ;EXERCISED.  CHECKS ARE MADE THAT THE PROPER BYTE IS MODIFIED AND
1206                                    ;THE CONDITION CODES ARE CHECKED.  IT IS ALSO VERIFIED THAT THE UNADDRESSED
1207                                    ;BYTE IS NOT ALTERED BY THE INSTRUCTION.
1208                                    ;
```

```
1209                                    .SBTTL  TEST # 50 - TEST MODE 1 ODD BYTE USING SOP INST
                                        ;*****************************************************************************
                                        ;TEST 50 - TEST MODE 1 ODD BYTE USING SOP INST
                                        ;*****************************************************************************
004352  005212                  TST50:  INC     (R2)            ;UPDATE TEST NUMBER
004354  022712  000050                  CMP     #50,(R2)        ;SEQUENCE ERROR?
004360  001026                          BNE     TST51-10        ;BR TO ERROR HALT ON SEQ ERROR
1210 004362  005000                     CLR     R0              ;INITIALIZE R0
1211 004364  005010                     CLR     (R0)            ;INITIALIZE LOC. 0
1212 004366  005110                     COM     (R0)
1213 004370  005200                     INC     R0              ;R0=ODD BYTE
1214 004372  105010                     CLRB    (R0)            ;TRY TO CLEAR BYTE 1
1215 004374  001406                     BEQ     SOPB1C
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 771           <====
004376  012762  000066  177776          MOV     #66,-2(R2)      ;MOVE TO MAILBOX #  *******  66  *******
004404  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
004410  000000                          HALT                    ;CLRB DID NOT SET Z-BIT
1216 004412  005300             SOPB1C: DEC     R0              ;R0=WORD ADDR.
1217 004414  005210                     INC     (R0)            ;INCREMENT TO TEST WORD
1218 004416  005200                     INC     R0              ;R0=ODD BYTE
1219 004420  105110                     COMB    (R0)            ;TRY TO COMPLEMENT BYTE 1
1220 004422  105210                     INCB    (R0)
1221 004424  100002                     BPL     SOPB1D
1222 004426  105210                     INCB    (R0)            ;TRY TO INCREMENT BYTE 1
1223 004430  001406                     BEQ     TST51
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 753           <====
004432                          SOPB1D:
004432  012762  000067  177776          MOV     #67,-2(R2)      ;MOVE TO MAILBOX #  *******  67  *******
004440  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
004444  000000                          HALT                    ;TEST CUMMULATIVE RESULT OF ABOVE INST.
                                                                ;  OR SEQUENCE ERROR
1224
1225                                    ;*****************************************************************************
1226                                    ;
1227                                    ;       THIS TEST VERIFIES MODE 2 SINGLE-OPERAND INSTRUCTIONS.  PREVIOUSLY
1228                                    ;TESTED INSTRUCTIONS ARE USED TO SET A POINTER IN R0 TO LOC. 400.
1229                                    ;LOC. 400 IS INITIALIZED TO -1 BEFORE A CLR MODE 2 IS EXECUTED.
1230                                    ;       THEN R0 IS DECREMENTED BY TWO TO AGAIN POINT TO 400 BEFORE EACH
1231                                    ;OF SEVERAL MODE 2 INSTRUCTIONS ARE USED TO VERIFY THE DATA RESULTS OF
1232                                    ;THE TEST.  THIS PROCEDURE ALSO VERIFIES THE PROPER INCREMENTING OF THE
1233                                    ;REGISTER.
1234                                    ;
```

```
1235                                    .SBTTL  TEST # 51 - TEST MODE 2 USING SOP INST.
                                        ;*****************************************************************************
                                        ;TEST 51 - TEST MODE 2 USING SOP INST.
                                        ;*****************************************************************************
004446  005212                        TST51:  INC     (R2)            ;UPDATE TEST NUMBER
004450  022712  000051                        CMP     #51,(R2)        ;SEQUENCE ERROR?
004454  001027                                BNE     TST52-10        ;BR TO ERROR HALT ON SEQ ERROR
1236 004456  005000                           CLR     R0              ;SET R0=400
1237 004460  105100                           COMB    R0
1238 004462  005200                           INC     R0
1239 004464  005010                           CLR     (R0)            ;CLEAR 400
1240 004466  005110                           COM     (R0)            ;INITIALIZE: 400=-1
1241 004470  005020                           CLR     (R0)+           ;TRY CLEARING WITH MODE 2
1242 004472  001406                           BEQ     SOPZA
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                      ;           WHICH FOLLOWS W/ 770           <====
004474  012762  000070  177776                MOV     #70,-2(R2)      ;MOVE TO MAILBOX #  *******  70  *******
004502  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
004506  000000                                HALT                    ;CLR INST DID NOT SET Z-BIT
1243 004510  005300                    SOPZA:  DEC     R0              ;RESET R0
1244 004512  005300                           DEC     R0
1245 004514  005120                           COM     (R0)+           ;TRY COMPLEMENTING WITH MODE 2
1246 004516  100004                           BPL     SOP2B
1247 004520  005300                           DEC     R0              ;RESET R0
1248 004522  005300                           DEC     R0
1249 004524  005220                           INC     (R0)+           ;TRY INCREMENTING WITH MODE 2
1250 004526  001406                           BEQ     TST52
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                      ;           WHICH FOLLOWS W/ 752           <====
004530                                  SOP2B:
004530  012762  000071  177776                MOV     #71,-2(R2)      ;MOVE TO MAILBOX #  *******  71  *******
004536  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
004542  000000                                HALT                    ;CHECK CUMMULATIVE RESULT OF ABOVE INST
                                                                      ;  OR SEQUENCE ERROR
1251
1252                                    ;*****************************************************************************
1253                                    ;
1254                                    ;       THIS TEST VERIFIES MODE 2 SINGLE OPERAND INSTRUCTIONS WHICH
1255                                    ;ADDRESS EVEN BYTES.  R0 IS SET TO 400 AND USED TO INITIALIZE LOCATION
1256                                    ;400 TO -1.  CLRB INSTRUCTION IS THEN EXECUTED ON BYTE 400 WITH
1257                                    ;MODE 2.
1258                                    ;       R0 IS THEN DECREMENTED BEFORE EACH OF SEVERAL MODE 2 INSTRUCTIONS
1259                                    ;WHICH ARE USED TO VERIFY THE DATA RESULTS OF THE TEST.  THIS PROCEDURE ALSO
1260                                    ;VERIFIES THE PROPER INCREMENTING OF THE REGISTER.
1261                                    ;
```

```
1262                                    .SBTTL  TEST # 52 - TEST MODE 2 EVEN BYTE USING SOP INST.
                                        ;*****************************************************************************
                                        ;TEST 52 - TEST MODE 2 EVEN BYTE USING SOP INST.
                                        ;*****************************************************************************
     004544  005212                     TST52:  INC     (R2)            ;UPDATE TEST NUMBER
     004546  022712  000052                     CMP     #52,(R2)        ;SEQUENCE ERROR?
     004552  001027                             BNE     TST53-10        ;BR TO ERROR HALT ON SEQ ERROR
1263 004554  005000                             CLR     R0              ;SET R0=400
1264 004556  105100                             COMB    R0
1265 004560  005200                             INC     R0
1266 004562  005010                             CLR     (R0)            ;CLEAR 400
1267 004564  005110                             COM     (R0)            ;INITIALIZE: 400=-1
1268 004566  105020                             CLRB    (R0)+           ;TRY TO CLEAT 400 W/MODE 2
1269 004570  001406                             BEQ     SOPB2A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 770           <====
     004572  012762  000072  177776                 MOV     #72,-2(R2)      ;MOVE TO MAILBOX #  *******  72  *******
     004600  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     004604  000000                             HALT                    ;CLR DID NOT SET Z-BIT
1270 004606  005300                     SOPB2A: DEC     R0              ;RESULT R0=400
1271 004610  005210                             INC     (R0)            ;INC 400 TO TEST WORD
1272 004612  105110                             COMB    (R0)
1273 004614  105220                             INCB    (R0)+           ;TRY TO INC EVEN BYTE
1274 004616  100003                             BPL     SOPB2B
1275 004620  005300                             DEC     R0              ;RESET R0=400
1276 004622  105220                             INCB    (R0)+           ;TRY INCREMENT OF EVEN BYTE
1277 004624  001406                             BEQ     TST53
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 752           <====
     004626                             SOPB2B:
     004626  012762  000073  177776                 MOV     #73,-2(R2)      ;MOVE TO MAILBOX #  *******  73  *******
     004634  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     004640  000000                             HALT                    ;TEST CUMMULATIVE RESULT OF ABOVE INST.
                                                                        ;  OR SEQUENCE ERROR
1278
1279                                    ;*****************************************************************************
1280                                    ;
1281                                    ;       THIS TEST FOLLOWS THE SAME PROCEDURE DESCRIBED IN THE PREVIOUS
1282                                    ;TEST.  HERE, THE BYTE INSTRUCTION IS USED TO ADDRESS AN ODD BYTE.
1283                                    ;
```

TEST # 53 - TEST MODE 2 ODD BYTE USING SOP INST.

```
1284                                    .SBTTL  TEST # 53 - TEST MODE 2 ODD BYTE USING SOP INST.
                                        ;*****************************************************************************
                                        ;TEST 53 - TEST MODE 2 ODD BYTE USING SOP INST.
                                        ;*****************************************************************************
     004642  005212                     TST53:  INC     (R2)            ;UPDATE TEST NUMBER
     004644  022712  000053                     CMP     #53,(R2)        ;SEQUENCE ERROR?
     004650  001032                             BNE     TST54-10        ;BR TO ERROR HALT ON SEQ ERROR
1285 004652  005000                             CLR     R0              ;SET R0=400
1286 004654  105100                             COMB    R0
1287 004656  005200                             INC     R0
1288 004660  005010                             CLR     (R0)            ;CLEAR LOC 400
1289 004662  005110                             COM     (R0)            ;INITIALIZE: 400=-1
1290 004664  005200                             INC     R0              ;R0=ODD BYTE
1291 004666  105020                             CLRB    (R0)+           ;TRY TO CLEAR ODD BYTE
1292 004670  001406                             BEQ     SOPB2C
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 767           <====
     004672  012762  000074  177776                 MOV     #74,-2(R2)      ;MOVE TO MAILBOX #  *******  74  *******
     004700  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     004704  000000                                 HALT                    ;CLRB DID NOT SET Z-BIT
1293 004706  005300                     SOPB2C: DEC     R0              ;R0=WORD ADDR.
1294 004710  005300                             DEC     R0
1295 004712  005220                             INC     (R0)+           ;INCREMENT WORD
1296 004714  005300                             DEC     R0              ;POINT TO ODD BYTE
1297 004716  105110                             COMB    (R0)            ;COMPLEMENT ODD BYTE
1298 004720  105220                             INCB    (R0)+           ;TRY TO INCREMENT ODD BYTE
1299 004722  100003                             BPL     SOPB2D
1300 004724  005300                             DEC     R0              ;RESET R0 TO ODD BYTE
1301 004726  105220                             INCB    (R0)+           ;TRY TO INCREMENT ODD BYTE
1302 004730  001406                             BEQ     TST54
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 747           <====
     004732                             SOPB2D:
     004732  012762  000075  177776                 MOV     #75,-2(R2)      ;MOVE TO MAILBOX #  *******  75  *******
     004740  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     004744  000000                                 HALT                    ;TEST CUMMULATIVE RESULT OF ABOVE INST.
                                                                            ;  OR SEQUENCE ERROR
1303
1304                                    ;*****************************************************************************
1305                                    ;
1306                                    ;       THESE TESTS CHECK THE NEGATE INSTRUCTION IN ALL MODES.  PREVIOUSLY
1307                                    ;TESTED SINGLE-OPERAND INSTRUCTIONS ARE USED TO TEST THE NEGATE INSTRUCTION.
1308                                    ;
```

```
1309                                    .SBTTL  TEST # 54 - TEST MODE 0 USING NEGATE INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 54 - TEST MODE 0 USING NEGATE INSTRUCTION
                                        ;*****************************************************************************
 004746  005212                         TST54:  INC     (R2)            ;UPDATE TEST NUMBER
 004750  022712  000054                         CMP     #54,(R2)        ;SEQUENCE ERROR?
 004754  001045                         .       BNE     TST55-10        ;BR TO ERROR HALT ON SEQ ERROR
1310 004756  005000                     .       CLR     R0              ;SET R0=0
1311 004760  005200                     .       INC     R0              ;    R0=1
1312 004762  005400                     .       NEG     R0              ;TRY NEGATE MODE 0:  R0=-1
1313 004764  100003                     .       BPL     NEG00           ;CC=1001?
1314 004766  001402                     .       BEQ     NEG00
1315 004770  102401                     .       BVS     NEG00
1316 004772  103406                     .       BCS     NEG01
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 770           <====
 004774                                 NEG00:
 004774  012762  000076  177776          .       MOV     #76,-2(R2)      ;MOVE TO MAILBOX #  *******  76  *******
 005002  005262  177774                 .       INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 005006  000000                         .       HALT                    ;NEGATE DID NOT SET CC'S CORRECTLY
1317
1318 005010  005200                     NEG01:  INC     R0              ;TEST DATA RESULT
1319 005012  001406                     .       BEQ     NEG02
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 760           <====
 005014  012762  000077  177776          .       MOV     #77,-2(R2)      ;MOVE TO MAILBOX #  *******  77  *******
 005022  005262  177774                 .       INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 005026  000000                         .       HALT                    ;DATA RESULT OF NEGATE INCORRECT
1320
1321 005030  105100                     NEG02:  COMB    R0              ;R0=377
1322 005032  105400                     .       NEGB    R0              ;R0=1
1323 005034  100403                     .       BMI     NEG03           ;CC=0001?
1324 005036  001402                     .       BEQ     NEG03
1325 005040  102401                     .       BVS     NEG03
1326 005042  103406                     .       BCS     NEG04
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 744           <====
 005044                                 NEG03:
 005044  012762  000100  177776          .       MOV     #100,-2(R2)     ;MOVE TO MAILBOX #  *******  100  *******
 005052  005262  177774                 .       INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 005056  000000                         .       HALT                    ;NEGB DID NOT SET CC'S CORRECTLY
1327 005060  005300                     NEG04:  DEC     R0              ;TEST DATA RESULT
1328 005062  001406                     .       BEQ     TST55
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 734           <====
 005064  012762  000101  177776          .       MOV     #101,-2(R2)     ;MOVE TO MAILBOX #  *******  101  *******
 005072  005262  177774                 .       INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 005076  000000                         .       HALT                    ;DATA RESULT OF NEGB INCORRECT
                                                                        ;  OR SEQUENCE ERROR
```

```
1329                                    .SBTTL  TEST # 55 - TEST MODE 1 USING NEGATE INST.
                                        ;*****************************************************************************
                                        ;TEST 55 - TEST MODE 1 USING NEGATE INST.
                                        ;*****************************************************************************
     005100  005212                     TST55:  INC     (R2)            ;UPDATE TEST NUMBER
     005102  022712  000055                     CMP     #55,(R2)        ;SEQUENCE ERROR?
     005106  001050                             BNE     TST56-10        ;BR TO ERROR HALT ON SEQ ERROR
1330 005110  005000                             CLR     R0              ;POINT TO LOC. 0
1331 005112  005010                             CLR     (R0)            ;CLEAR LOC. 0
1332 005114  005210                             INC     (R0)            ;LOC. 0=1
1333 005116  005410                             NEG     (R0)            ;TRY NEG. LOC. 0=-1
1334 005120  100003                             BPL     NEG10           ;CC=1001
1335 005122  001402                             BEQ     NEG10
1336 005124  102401                             BVS     NEG10
1337 005126  103406                             BCS     NEG11
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 767           <====
     C05130                             NEG10:
     005130  012762  000102  177776             MOV     #102,-2(R2)     ;MOVE TO MAILBOX #  *******  102  *******
     005136  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005142  000000                             HALT                    ;NEGATE DID NOT SET CC'S CORRECTLY
1338
1339 005144  005237  000000             NEG11:  INC     @#0             ;TEST DATA RESULT
1340 005150  001406                             BEQ     NEG12
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 756           <====
     005152  012762  000103  177776             MOV     #103,-2(R2)     ;MOVE TO MAILBOX #  *******  103  *******
     005160  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005164  000000                             HALT                    ;DATA RESULT OF NEGATE INCORRECT
1341 005166  105110                     NEG12:  COMB    (R0)            ;LOC. 0=377
1342 005170  105410                             NEGB    (R0)            ;TRY NEGB LOC. 0=1
1343 005172  100403                             BMI     NEG13           ;CC=0001?
1344 005174  001402                             BEQ     NEG13
1345 005176  102401                             BVS     NEG13
1346 005200  103406                             BCS     NEG14
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 742           <====
     005202                             NEG13:
     005202  012762  000104  177776             MOV     #104,-2(R2)     ;MOVE TO MAILBOX #  *******  104  *******
     005210  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005214  000000                             HALT                    ;NEGB DID NOT SET CC'S CORRECTLY
1347 005216  005337  000000             NEG14:  DEC     @#0             ;TEST DATA RESULT
1348 005222  001406                             BEQ     TST56
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 731           <====
     005224  012762  000105  177776             MOV     #105,-2(R2)     ;MOVE TO MAILBOX #  *******  105  *******
     005232  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005236  000000                             HALT                    ;DATA RESULT OF NEGB INCORRECT
                                                                        ;  OR SEQUENCE ERROR
```

```
1349                                    .SBTTL  TEST # 56 - TEST MODE 2 USING NEGATE INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 56 - TEST MODE 2 USING NEGATE INSTRUCTION
                                        ;*****************************************************************************
     005240  005212                     TST56:  INC     (R2)            ;UPDATE TEST NUMBER
     005242  022712  000056             CMP     #56,(R2)        ;SEQUENCE ERROR?
     005246  001040                     BNE     TST57-10        ;BR TO ERROR HALT ON SEQ ERROR
1350 005250  005000                     CLR     R0              ;POINT TO LOC. 0
1351 005252  005010                     CLR     (R0)            ;CLEAR LOC. 0
1352 005254  005210                     INC     (R0)            ;LOC. 0=1
1353 005256  005420                     NEG     (R0)+           ;TRY NEG.: LOC. 0=-1
1354 005260  100003                     BPL     NEG20           ;CC=1001?
1355 005262  001402                     BEQ     NEG20
1356 005264  102401                     BVS     NEG20
1357 005266  103406                     BCS     NEG21
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 767           <====
     005270                             NEG20:
     005270  012762  000106  177776             MOV     #106,-2(R2)     ;MOVE TO MAILBOX #  *******  106  *******
     005276  005262  177774             INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005302  000000                     HALT                    ;NEGATE DID NOT SET CC'S CORRECTLY
1358 005304  105300                     NEG21:  DECB    R0              ;R0=LOC. 0
1359 005306  105300                     DECB    R0
1360 005310  105420                     NEGB    (R0)+           ;BYTE 0=1   R0=1
1361 005312  105420                     NEGB    (R0)+           ;BYTE 1=1   R0=2
1362 005314  105340                     DECB    -(R0)           ;R0=1  LOC. 0=01
1363 005316  005300                     DEC     R0              ;R0=0
1364 005320  001406                     BEQ     NEG22
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 752           <====
     005322  012762  000107  177776             MOV     #107,-2(R2)     ;MOVE TO MAILBOX #  *******  107  *******
     005330  005262  177774             INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005334  000000                     HALT                    ;REGISTER NOT INCREMENTED CORRECTLY
1365 005336  005337  000000     NEG22:  DEC     @#0             ;LOC. 0=0
1366 005342  001406                     BEQ     TST57
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 741           <====
     005344  012762  000110  177776             MOV     #110,-2(R2)     ;MOVE TO MAILBOX #  *******  110  *******
     005352  005262  177774             INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005356  000000                     HALT                    ;NEG BYTE INSTRUCTIONS FAILED
                                                                ;  OR SEQUENCE ERROR
1367
1368                                    ;*****************************************************************************
1369                                    ;
1370                                    ;       THIS TEST VERIFIES MODE 3 SINGLE OPERAND INSTRUCTIONS.  IT
1371                                    ;USES LOCATION 0 AS ITS TARGET DATA.  A TABLE LOCATED AT LOC. 400
1372                                    ;THRU 402 IS USED TO SUPPLY THE ADDRESS OF LOCATION 0 TO THE
1373                                    ;INSTRUCTIONS UNDER TEST.
1374                                    ;       R0 IS SET TO 400, THE START OF THE ADDRESS TABLE, AND A CLR
1375                                    ;INSTRUCTION IS EXECUTED WITH MODE 3 TO CLEAR LOC. 0.  THEN R0
1376                                    ;IS DECREMENTED BY TWO AND TWO OTHER MODE 3 INSTRUCTIONS OPERATE ON
```

```
                        ;LOC. 0 TO VERIFY THE DATA RESULTS OF THE TEST.  THE PROPER INCREMENTING
                        ;OF THE REGISTER IS ALSO VERIFIED IN THIS MANNER.
                        ;       IF A FAILURE IS DETECTED BE SURE TO VERIFY THAT THE TABLE
                        ;(LOC. 400-402) HAS THE PROPER VALUES (0).
                        ;
```

TEST # 57 - TEST MODE 3 USING SOP INST.

```
1382                                    .SBTTL  TEST # 57 - TEST MODE 3 USING SOP INST.
                                        ;*************************************************************************
                                        ;TEST 57 - TEST MODE 3 USING SOP INST.
                                        ;*************************************************************************
     005360  005212                     TST57:  INC     (R2)            ;UPDATE TEST NUMBER
     005362  022712  000057                     CMP     #57,(R2)        ;SEQUENCE ERROR?
     005366  001024                             BNE     TST60-10        ;BR TO ERROR HALT ON SEQ ERROR
1383 005370  005000                             CLR     R0              ;SET R0=400
1384 005372  105100                             COMB    R0
1385 005374  005200                             INC     R0
1386 005376  005010                             CLR     (R0)            ;CLEAR LOC 400
1387 005400  005030                             CLR     @(R0)+          ;TRY TO CLEAR LOC 0 USING MODE 3 ;R0=402
1388 005402  001406                             BEQ     SOP3A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 771           <====
     005404  012762  000111  177776             MOV     #111,-2(R2)     ;MOVE TO MAILBOX #  *******  111  *******
     005412  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005416  000000                             HALT                    ;CLR DID NOT SET Z-BIT
1389 005420  005300                     SOP3A:  DEC     R0              ;RESET R0=400
1390 005422  005300                             DEC     R0
1391 005424  005130                             COM     @(R0)+          ;TRY TO COMPLEMENT LOC 0 OF MODE 3  ;R0=402
1392 005426  100002                             BPL     SOP3B
1393 005430  005230                             INC     @(R0)+          ;TRY TO INCREMENT LOC 0 W/MODE 3  ;R0=404
1394 005432  001406                             BEQ     TST60
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 755           <====
     005434                             SOP3B:
     005434  012762  000112  177776             MOV     #112,-2(R2)     ;MOVE TO MAILBOX #  *******  112  *******
     005442  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005446  000000                             HALT                    ;CUMMULATIVE RESULT OF ABOVE INST FAILED
                                                                        ;  OR SEQUENCE ERROR
1395
1396                                    ;*************************************************************************
1397                                    ;
1398                                    ;       THIS TEST VERIFIES MODE 3 SINGLE OPERAND BYTE INSTRUCTIONS
1399                                    ;WHICH ADDRESS EVEN BYTES.  AGAIN, THE TARGET LOCATION 0 IS USED
1400                                    ;AND THE SAME TABLE AT 400 IS EMPLOYED.
1401                                    ;       AFTER POINTING R4 TO THE TABLE (400) AND SETTING LOCATION
1402                                    ;0 TO -1, A CLRB INSTRUCTION IS USED TO CLEAR BYTE 0.
1403                                    ;       SEVERAL OTHER MODE 3 INSTRUCTIONS ARE THEN USED WITH THE TABLE
1404                                    ;TO VERIFY THE DATA RESULTS AND THE PROPER INCREMENTING OF THE REGISTER.
1405                                    ;IF A FAILURE IS DETECTED, BE SURE THAT THE TABLE (LOCATION 400-402) HAS
1406                                    ;THE PROPER VALUES (0).
1407                                    ;
```

```
1408                                    .SBTTL  TEST # 60 - TEST MODE 3 EVEN BYTE USING SOP INST.
                                        ;*************************************************************************
                                        ;TEST 60 - TEST MODE 3 EVEN BYTE USING SOP INST.
                                        ;*************************************************************************
     005450  005212                     TST60:  INC     (R2)            ;UPDATE TEST NUMBER
     005452  022712  000060                     CMP     #60,(R2)        ;SEQUENCE ERROR?
     005456  001032                             BNE     TST61-10        ;BR TO ERROR HALT ON SEQ ERROR
1409 005460  005004                             CLR     R4              ;SET R4=400
1410 005462  105104                             COMB    R4
1411 005464  005204                             INC     R4
1412 005466  005000                             CLR     R0              ;INITIALIZE LOC. 0=-1
1413 005470  005010                             CLR     (R0)
1414 005472  005110                             COM     (R0)            ;LOC. 0=-1
1415 005474  105034                             CLRB    @(R4)+          ;TRY TO CLEAR EVEN BYTE ;LOC. 0=177400  R4=402
1416 005476  001406                             BEQ     SOPB3A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 767           <====
     005500  012762  000113  177776                 MOV     #113,-2(R2)     ;MOVE TO MAILBOX #  *******  113  *******
     005506  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005512  000000                                 HALT                    ;CLRB DID NOT SET Z-BIT
1417 005514  005304                     SOPB3A: DEC     R4              ;RESET POINTER  R4=400
1418 005516  005304                             DEC     R4
1419 005520  005234                             INC     @(R4)+          ;TRY INCREMENTING WORD  LOC.0=177401  R4=402
1420 005522  100006                             BPL     SOPB3B
1421 005524  105434                             NEGB    @(R4)+          ;TRY TO NEGATE EVEN BYTE ;LOC.0=-1 R4=404
1422 005526  100004                             BPL     SOPB3B
1423 005530  005304                             DEC     R4              ;R4=402
1424 005532  005304                             DEC     R4
1425 005534  105234                             INCB    @(R4)+          ;TRY TO INCREMENT EVEN BYTE ;LOC. 0=17400
1426 005536  001406                             BEQ     TST61
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 747           <====
     005540                             SOPB3B:
     005540  012762  000114  177776                 MOV     #114,-2(R2)     ;MOVE TO MAILBOX #  *******  114  *******
     005546  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005552  000000                                 HALT                    ;CUMMULATIVE RESULT OF ABOVE INST FAILED
                                                                            ;  OR SEQUENCE ERROR
1427
1428                                    ;*************************************************************************
1429                                    ;
1430                                    ;       THIS TEST VERIFIES MODE 3 SINGLE OPERAND BYTE INSTRUCTIONS
1431                                    ;WHICH ADDRESS ODD BYTES.  THE TARGET IS BYTE 1.  A TABLE AT
1432                                    ;LOC. 400-406 IS USED.  R0 SERVES AS THE TABLE POINTER.
1433                                    ;       R0 IS INITIALIZED TO 400.  LOC. 0 IS SET TO -1 USING THE
1434                                    ;FIRST TWO TABLE ENTRIES.  A CLRB MODE 3 IS EXECUTED ON BYTE 1 USING
1435                                    ;TABLE ADDRESS AT 404.  R0 IS DECREMENTED TO 402 AND SEVERAL SOP
1436                                    ;MODE 3 INSTRUCTIONS ARE USED TO VERIFY DATA RESULTS AND PROPER
1437                                    ;REGISTER INCREMENTING.
1438                                    ;       THE TABLE (400-406) SHOULD CONTAIN 0,0,1,1 BEFORE AND
1439                                    ;AFTER THE TEST IS RUN.
1440                                    ;
```

TEST # 61 - TEST MODE 3 ODD BYTE USING SOP INST.

```
1441                                    .SBTTL  TEST # 61 - TEST MODE 3 ODD BYTE USING SOP INST.
                                        ;*****************************************************************************
                                        ;TEST 61 - TEST MODE 3 ODD BYTE USING SOP INST.
                                        ;*****************************************************************************
     005554  005212                     TST61:  INC     (R2)            ;UPDATE TEST NUMBER
     005556  022712  000061                     CMP     #61,(R2)        ;SEQUENCE ERROR?
     005562  001030                             BNE     TST62-10        ;BR TO ERROR HALT ON SEQ ERROR
1442 005564  005000                             CLR     R0              ;SET R0=400
1443 005566  105100                             COMB    R0
1444 005570  005200                             INC     R0
1445 005572  005030                             CLR     @(R0)+          ;INITIALIZE
1446 005574  005130                             COM     @(R0)+          ;LOC 0=-1 R0=404
1447 005576  105030                             CLRB    @(R0)+          ;TRY TO CLEAR ODD BYTE LOC. 0=377 R0=406
1448 005600  001406                             BEQ     SOPB3C
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 770           <====
     005602  012762  000115  177776                 MOV     #115,-2(R2)     ;MOVE TO MAILBOX #  *******  115  *******
     005610  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005614  000000                                 HALT                    ;CLRB DID NOT SET Z-BIT
1449 005616  005300                     SOPB3C: DEC     R0              ;RESET R0=402
1450 005620  005300                             DEC     R0
1451 005622  005300                             DEC     R0              ;POINT TO EVEN BYTE ADDR.
1452 005624  005300                             DEC     R0
1453 005626  005230                             INC     @(R0)+          ;INCREMENT WORD LOC. 0=400 R0=404
1454 005630  105430                             NEGB    @(R0)+          ;TRY TO NEGATE ODD BYTE LOC. 0=177400 R0=406
1455 005632  100002                             BPL     SOPB3D
1456 005634  105230                             INCB    @(R0)+          ;TRY TO INCREMENT ODD BYTE LOC.0=0 R0=410
1457 005636  001406                             BEQ     TST62
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 751           <====
     005640                             SOPB3D:
     005640  012762  000116  177776                 MOV     #116,-2(R2)     ;MOVE TO MAILBOX #  *******  116  *******
     005646  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005652  000000                                 HALT                    ;CUMMULATIVE RESULT OF ABOVE INSTS FAILED
                                                                            ;  OR SEQUENCE ERROR
```

```
1458                                    .SBTTL  TEST # 62 - TEST MODE 3 USING NEGATE INSTRUCTION
                                        ;*************************************************************************
                                        ;TEST 62 - TEST MODE 3 USING NEGATE INSTRUCTION
                                        ;*************************************************************************
     005654  005212                     TST62:  INC     (R2)            ;UPDATE TEST NUMBER
     005656  022712  000062                     CMP     #62,(R2)        ;SEQUENCE ERROR?
     005662  001066                             BNE     TST63-10        ;BR TO ERROR HALT ON SEQ ERROR
1459 005664  005000                             CLR     R0              ;R0=400
1460 005666  105100                             COMB    R0
1461 005670  005200                             INC     R0
1462 005672  005010                             CLR     (R0)            ;LOC. 400=0
1463 005674  005004                             CLR     R4              ;R4=0
1464 005676  005014                             CLR     (R4)            ;LOC. 0=0
1465 005700  005214                             INC     (R4)            ;LOC. 0=1
1466 005702  005430                             NEG     @(R0)+          ;TRY NEGATE   LOC. 0=-1  R0=402
1467 005704  100003                             BPL     NEG30           ;CC=1001?
1468 005706  001402                             BEQ     NEG30
1469 005710  102401                             BVS     NEG30
1470 005712  103406                             BCS     NEG31
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 763           <====
     005714                             NEG30:
     005714  012762  000117  177776             MOV     #117,-2(R2)     ;MOVE TO MAILBOX #  *******  117  *******
     005722  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005726  000000                             HALT                    ;NEG DID NOT SET CC'S CORRECTLY
1471 005730  005214                     NEG31:  INC     (R4)            ;LOC. 0=0
1472 005732  001406                             BEQ     NEG32
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 753           <====
     005734  012762  000120  177776             MOV     #120,-2(R2)     ;MOVE TO MAILBOX #  *******  120  *******
     005742  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005746  000000                             HALT                    ;DATA RESULT OF NEG INCORRECT
1473 005750  105137  000001             NEG32:  COMB    @#1             ;LOC 0=177400
1474 005754  005237  000000                     INC     @#0             ;LOC. 0=177401
1475 005760  105430                             NEGB    @(R0)+          ;TRY NEGB LOC. 0=177777  R0=404
1476 005762  100406                             BMI     NEG33
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 737           <====
     005764  012762  000121  177776             MOV     #121,-2(R2)     ;MOVE TO MAILBOX #  *******  121  *******
     005772  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     005776  000000                             HALT                    ;NEGB FAILED WITH EVEN BYTE
1477 006000  105430                     NEG33:  NEGB    @(R0)+          ;TRY NEGB  LOC.0=777  R0=406
1478 006002  100006                             BPL     NEG34
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 727           <====
     006004  012762  000122  177776             MOV     #122,-2(R2)     ;MOVE TO MAILBOX #  *******  122  *******
     006012  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     006016  000000                             HALT                    ;NEGB FAILED WITH ODD BYTE
1479 006020  105137  000001             NEG34:  COMB    @#1             ;LOC. 0=177377
```

```
1480 006024  105237  000001                    INCB    @#1             ;LOC. 0=177777
1481 006030  005214                            INC     (R4)            ;LOC. 0=0
1482 006032  001406                            BEQ     TST63
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 713           <====
     006034  012762  000123  177776              MOV     #123,-2(R2)     ;MOVE TO MAILBOX #  *******  123  *******
     006042  005262  177774                      INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     006046  000000                              HALT                    ;DATA RESULT OF NEGB'S INCORRECT
                                                                         ;  OR SEQUENCE ERROR
1483
1484                                    ;*************************************************************************************
1485                                    ;
1486                                    ;       THIS TEST VERIFIES MODE 4 SINGLE OPERAND INSTRUCTIONS.
1487                                    ;R0 IS SET TO 400. A CLR INSTRUCTION IS EXECUTED IN MODE 4 TO CLEAR
1488                                    ;LOC. 376. R0 IS RESET TO 400 AND A COM INSTRUCTION USING MODE 4
1489                                    ;COMPLEMENTS LOC.376.
1490                                    ;       TWO INC INSTRUCTIONS AND A MODE 4 INSTRUCTION ARE EXECUTED
1491                                    ;TO COMPLETE THE TEST.
```

```
1492                                    .SBTTL  TEST # 63 - TEST MODE 4 USING SOP INSTS
                                        ;*************************************************************************
                                        ;TEST 63 - TEST MODE 4 USING SOP INSTS
                                        ;*************************************************************************
     006050  005212                     TST63:  INC     (R2)            ;UPDATE TEST NUMBER
     006052  022712  000063                     CMP     #63,(R2)        ;SEQUENCE ERROR?
     006056  001025                             BNE     TST64-10        ;BR TO ERROR HALT ON SEQ ERROR
1493 006060  005000                             CLR     R0              ;SET R0=400
1494 006062  105100                             COMB    R0
1495 006064  005200                             INC     R0
1496 006066  005040                             CLR     -(R0)           ;TRY TO CLEAR USING MODE 4
1497 006070  001406                             BEQ     SOP4A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 772           <====
     006072  012762  000124  177776             MOV     #124,-2(R2)     ;MOVE TO MAILBOX #  *******  124  *******
     006100  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     006104  000000                             HALT                    ;CLR DID NOT SET Z-BIT
1498 006106  005200                     SOP4A:  INC     R0              ;RESET R0
1499 006110  005200                             INC     R0
1500 006112  005140                             COM     -(R0)           ;TRY TO COMPLEMENT USING MODE 4
1501 006114  100004                             BPL     SOP4B
1502 006116  005200                             INC     R0              ;MOVE POINTER
1503 006120  005200                             INC     R0
1504 006122  005240                             INC     -(R0)
1505 006124  001406                             BEQ     TST64
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 754           <====
     006126                             SOP4B:
     006126  012762  000125  177776             MOV     #125,-2(R2)     ;MOVE TO MAILBOX #  *******  125  *******
     006134  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     006140  000000                             HALT                    ;CHECK CUMMULATIVE RESULT OF ABOVE INST.
                                                                        ;  OR SEQUENCE ERROR
1506
1507                                    ;*************************************************************************
1508                                    ;
1509                                    ;       THIS TEST VERIFIES MODE 5 SINGLE OPERAND INSTRUCTIONS.  IT
1510                                    ;USES LOCATION 0 AS ITS TARGET DATA.  A TABLE LOCATED AT LOC. 372
1511                                    ;THRU 374 IS USED TO SUPPLY THE ADDRESS OF LOCATION 0 TO THE
1512                                    ;INSTRUCTIONS UNDER TEST.
1513                                    ;       R0 IS SET TO 376, (THE START OF THE ADDRESS TABLE) +2,
1514                                    ;AND A CLR INSTRUCTION IS EXECUTED WITH MODE 3 TO CLEAR
1515                                    ;LOC. 0.  THEN R0 IS INCREMENTED BY TWO AND TWO OTHER MODE 3
1516                                    ;INSTRUCTIONS OPERATE ON LOC. 0 TO VERIFY THE DATA RESULTS OF
1517                                    ;THE TEST.  THE PROPER DECREMENTING OF THE REGISTER IS ALSO
1518                                    ;VERIFIED IN THIS MANNER.
1519                                    ;       IF A FAILURE IS DETECTED BE SURE TO VERIFY THAT THE TABLE
1520                                    ;(LOC. 372 THRU 374) HAS THE PROPER VALUES (0).
1521                                    ;
```

```
                                .SBTTL  TEST # 64 - TEST MODE 5 USING SOP INSTS
                                ;*****************************************************************************
                                ;TEST 64 - TEST MODE 5 USING SOP INSTS
                                ;*****************************************************************************
006142  005212                  TST64:  INC     (R2)            ;UPDATE TEST NUMBER
006144  022712  000064                  CMP     #64,(R2)        ;SEQUENCE ERROR?
006150  001023                          BNE     TST65-10        ;BR TO ERROR HALT ON SEQ ERROR
006152  005000                          CLR     R0              ;SET R0=376
006154  005020                          CLR     (R0)+
006156  105400                          NEGB    R0
006160  005050                          CLR     @-(R0)          ;TRY TO CLEAR LOC 0 W/MODE 5
006162  001406                          BEQ     SOP5A
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 772           <====
006164  012762  000126  177776          MOV     #126,-2(R2)     ;MOVE TO MAILBOX #  *******  126  *******
006172  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
006176  000000                          HALT                    ;CLR DID NOT SET Z-BIT
006200  005200                  SOP5A:  INC     R0              ;RESET R0
006202  005200                          INC     R0
006204  005150                          COM     @-(R0)          ;TRY TO COMPLEMENT LOC. 0 W/MODE 5
006206  100002                          BPL     SOP5B
006210  005250                          INC     @-(R0)          ;TRY TO INCREMENT LOC. 0 W/MODE 5
006212  001406                          BEQ     TST65
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 756           <====
006214                          SOP5B:
006214  012762  000127  177776          MOV     #127,-2(R2)     ;MOVE TO MAILBOX #  *******  127  *******
006222  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
006226  000000                          HALT                    ;TEST CUMMULATIVE RESULT OF ABOVE INSTS
                                                                ;  OR SEQUENCE ERROR

                                ;*****************************************************************************
                                ;
                                ;       THIS TEST VERIFIES MODE 6 SINGLE OPERAND INSTRUCTIONS.  IT
                                ;USES LOCATION 0 AS ITS TARGET DATA.  R0 IS SET TO 400 USING
                                ;PREVIOUSLY TESTED INSTRUCTIONS AND A MODE 6 CLR INSTRUCTION IS
                                ;EXECUTED ON LOC. 0 USING R0 AND A -400 OFFSET.  COM AND INC
                                ;INSTRUCTIONS ARE THEN USED TO VERIFY THE DATA.
                                ;
```

```
1543                                    .SBTTL  TEST # 65 - TEST MODE 6 USING SOP INSTS
                                        ;*****************************************************************************
                                        ;TEST 65 - TEST MODE 6 USING SOP INSTS
                                        ;*****************************************************************************
                                        ;
        006230  005212                  TST65:  INC     (R2)            ;UPDATE TEST NUMBER
        006232  022712  000065                  CMP     #65,(R2)        ;SEQUENCE ERROR?
        006236  001024                          BNE     TST66-10        ;BR TO ERROR HALT ON SEQ ERROR
1544    006240  005000                          CLR     R0              ;SET R0=400
1545    006242  105100                          COMB    R0
1546    006244  005200                          INC     R0
1547    006246  005060  177400                 CLR     -400(R0)        ;TRY TO CLEAR LOCATION 0 W/MODE 6
1548    006252  001406                          BEQ     SOP6A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 771           <====
        006254  012762  000130  177776          MOV     #130,-2(R2)     ;MOVE TO MAILBOX #  *******  130  *******
        006262  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        006266  000000                          HALT                    ;CLR DID NOT SET Z-BIT
1549    006270  005160  177400          SOP6A:  COM     -400(R0)        ;TRY TO COMPLEMENT LOCATION 0 W/MODE 6
1550    006274  100003                          BPL     SOP6B
1551    006276  005260  177400                 INC     -400(R0)        ;TRY TO INCREMENT LOCATION 0 W/MODE 6
1552    006302  001406                          BEQ     TST66
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 755           <====
        006304                          SOP6B:
        006304  012762  000131  177776          MOV     #131,-2(R2)     ;MOVE TO MAILBOX #  *******  131  *******
        006312  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        006316  000000                          HALT                    ;TEST CUMMULATIVE RESULT OF ABOVE INSTS
                                                                        ;  OR SEQUENCE ERROR
1553
1554                                    ;*****************************************************************************
1555                                    ;
1556                                    ;       THIS TEST VERIFIES MODE 7 SINGLE OPERAND INSTRUCTIONS.  IT USES
1557                                    ;THE POINTER TO LOC. 0 WHICH IS STORED AT LOC. 402.
1558                                    ;       R0 IS SET TO 400 AND A MODE 7 CLR INSTRUCTION IS
1559                                    ;EXECUTED WITH A +2 OFFSET TO CLEAR LOC. 0.
1560                                    ;       SEVERAL OTHER MODE 7 INSTRUCTIONS ARE THEN USED ON THE COMMON
1561                                    ;LOCATION TO VERIFY THE DATA RESULTS.
1562                                    ;
```

```
1563                                    .SBTTL  TEST # 66 - TEST MODE 7 USING SOP INST.
                                        ;*************************************************************************
                                        ;TEST 66 - TEST MODE 7 USING SOP INST.
                                        ;*************************************************************************
                                        ;
     006320  005212                     TST66:  INC     (R2)            ;UPDATE TEST NUMBER
     006322  022712  000066                     CMP     #66,(R2)        ;SEQUENCE ERROR?
     006326  001025                             BNE     TST67-10        ;BR TO ERROR HALT ON SEQ ERROR
1564 006330  005000                             CLR     R0              ;SET R0=400
1565 006332  105100                             COMB    R0
1566 006334  005200                             INC     R0
1567 006336  005210                             INC     (R0)            ;R0=1
1568 006340  005070  000002                     CLR     @2(R0)          ;TRY TO CLEAR LOC. 0 W/MODE 7
1569 006344  001406                             BEQ     SOP7A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 770           <====
     006346  012762  000132  177776             MOV     #132,-2(R2)     ;MOVE TO MAILBOX #  *******  132  *******
     006354  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     006360  000000                             HALT                    ;CLR DID NOT SET Z-BIT
1570 006362  005170  000002             SOP7A:  COM     @2(R0)          ;TRY TO COMPLEMENT LOC. 0 W/MODE 7
1571 006366  100003                             BPL     SOP7B
1572 006370  005270  000002                     INC     @2(R0)          ;TRY TO INCREMENT LOC. 0 W/MODE 7
1573 006374  001406                             BEQ     TST67
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 754           <====
     006376                             SOP7B:
     006376  012762  000133  177776             MOV     #133,-2(R2)     ;MOVE TO MAILBOX #  *******  133  *******
     006404  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     006410  000000                             HALT                    ;TEST CUMMULATIVE RESULT OF ABOVE INSTS.
                                                                        ;  OR SEQUENCE ERROR
1574
```

```
1575                                    .SBTTL  TEST # 67 - TEST MODE 4 WITH NEGATE INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 67 - TEST MODE 4 WITH NEGATE INSTRUCTION
                                        ;*****************************************************************************
 006412  005212                        TST67:  INC     (R2)            ;UPDATE TEST NUMBER
 006414  022712  000067                        CMP     #67,(R2)        ;SEQUENCE ERROR?
 006420  001032                                BNE     TST70-10        ;BR TO ERROR HALT ON SEQ ERROR
1576 006422  005000                            CLR     R0
1577 006424  005010                            CLR     (R0)
1578 006426  005120                            COM     (R0)+           ;LOC. 0=177777,  R0=2
1579 006430  005440                            NEG     -(R0)           ;TRY NEGATE, LOC. 0=1
1520 006432  100403                            BMI     NEG40           ;CC=0001?
1581 006434  001402                            BEQ     NEG40
1582 006436  102401                            BVS     NEG40
1583 006440  103406                            BCS     NEG41
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 767           <====
 006442                                 NEG40:
 006442  012762  000134  177776                 MOV     #134,-2(R2)     ;MOVE TO MAILBOX #  *******  134  *******
 006450  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 006454  000000                                 HALT                    ;NEG DID NOT SET CC'S CORRECTLY
1584 006456  005400                    NEG41:  NEG     R0              ;TST R0 WITH A NEG.
1585 006460  001406                            BEQ     NEG42
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 757           <====
 006462  012762  000135  177776                 MOV     #135,-2(R2)     ;MOVE TO MAILBOX #  *******  135  *******
 006470  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 006474  000000                                 HALT                    ;R0 NOT DECREMENTED PROPERLY
1586 006476  005310                    NEG42:  DEC     (R0)            ;TEST DTA RESULT OF NEG
1587 006500  001406                            BEQ     TST70
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 747           <====
 006502  012762  000136  177776                 MOV     #136,-2(R2)     ;MOVE TO MAILBOX #  *******  136  *******
 006510  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 006514  000000                                 HALT                    ;DATA RESULT OF NEG INCORRECT
                                                                        ;  OR SEQUENCE ERROR
```

```
1588                                    .SBTTL  TEST # 70 - TEST MODE 5 WITH NEGATE INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 70 - TEST MODE 5 WITH NEGATE INSTRUCTION
                                        ;*****************************************************************************
     006516  005212                     TST70:  INC     (R2)            ;UPDATE TEST NUMBER
     006520  022712  000070                     CMP     #70,(R2)        ;SEQUENCE ERROR?
     006524  001037                             BNE     TST71-10        ;BR TO ERROR HALT ON SEQ ERROR
1589 006526  005000                             CLR     R0              ;R0=0
1590 006530  005010                             CLR     (R0)            ;LOC. 0=0
1591 006532  105100                             COMB    R0              ;R0=377
1592 006534  005200                             INC     R0              ;R0=400
1593 006536  005010                             CLR     (R0)            ;SET 400 = 0
1594 006540  005004                             CLR     R4              ;R4=0
1595 006542  005314                             DEC     (R4)            ;LOC. 0=177777
1596 006544  005450                             NEG     @-(R0)          ;TRY NEGATE:  LOC. 0=1
1597 006546  100403                             BMI     NEG50           ;CC=0001?
1598 006550  001402                             BEQ     NEG50
1599 006552  102401                             BVS     NEG50
1600 006554  103406                             BCS     NEG51
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 763           <====
     006556                             NEG50:
     006556  012762  000137  177776             MOV     #137,-2(R2)     ;MOVE TO MAILBOX #  *******  137  *******
     006564  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     006570  000000                             HALT                    ;NEG DID NOT SET CC'S CORRECTLY
1601 006572  005314                     NEG51:  DEC     (R4)
1602 006574  001406                             BEQ     NEG52
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 753           <====
     006576  012762  000140  177776             MOV     #140,-2(R2)     ;MOVE TO MAILBOX #  *******  140  *******
     006604  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     006610  000000                             HALT                    ;DATA RESULT OF NEG INCORRECT
1603 006612  105100                     NEG52:  COMB    R0
1604 006614  005300                             DEC     R0
1605 006616  001406                             BEQ     TST71
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 742           <====
     006620  012762  000141  177776             MOV     #141,-2(R2)     ;MOVE TO MAILBOX #  *******  141  *******
     006626  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     006632  000000                             HALT                    ;REGISTER NOT DECREMENTED PROPERLY
                                                                        ;  OR SEQUENCE ERROR
```

```
1606                                    .SBTTL  TEST # 71 - TEST MODE 6 WITH NEGATE
                                        ;*****************************************************************************
                                        ;TEST 71 - TEST MODE 6 WITH NEGATE
                                        ;*****************************************************************************
 006634  005212                         TST71:  INC     (R2)            ;UPDATE TEST NUMBER
 006636  022712  000071                         CMP     #71,(R2)        ;SEQUENCE ERROR?
 006642  001026                                 BNE     TST72-10        ;BR TO ERROR HALT ON SEQ ERROR
1607 006644  005000                             CLR     R0              ;R0=0
1608 006646  005004                             CLR     R4              ;R4=0
1609 006650  105100                             COMB    R0              ;R0=377
1610 006652  005014                             CLR     (R4)            ;LOC. 0=0
1611 006654  105024                             CLRB    (R4)+           ;LOC. 0=177777,  R4=1
1612 006656  105114                             COMB    (R4)            ;LOC. 0=177400
1613 006660  005460  177401                     NEG     -377(R0)        ;LOC. 0=400
1614 006664  100403                             BMI     NEG60           ;CC=0001
1615 006666  001402                             BEQ     NEG60
1616 006670  102401                             BVS     NEG60
1617 006672  103406                             BCS     NEG61
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 763           <====
 006674                                 NEG60:
 006674  012762  000142  177776                 MOV     #142,-2(R2)     ;MOVE TO MAILBOX #  *******  142  *******
 006702  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 006706  000000                                 HALT                    ;NEG DID NOT SET CC'S CORRECTLY
1618 006710  105314                     NEG61:  DECB    (R4)
1619 006712  001406                             BEQ     TST72
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 753           <====
 006714  012762  000143  177776                 MOV     #143,-2(R2)     ;MOVE TO MAILBOX #  *******  143  *******
 006722  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 006726  000000                                 HALT                    ;DATA RESULT OF NEG INCORRECT
                                                                        ;  OR SEQUENCE ERROR
```

```
1620                                    .SBTTL  TEST # 72 - TEST MODE 7 W/ NEGATE
                                        ;*****************************************************************************
                                        ;TEST 72 - TEST MODE 7 W/ NEGATE
                                        ;*****************************************************************************
                                        ;
      006730  005212                    TST72:  INC     (R2)            ;UPDATE TEST NUMBER
      006732  022712  000072                    CMP     #72,(R2)        ;SEQUENCE ERROR?
      006736  001030                            BNE     TST73-10        ;BR TO ERROR HALT ON SEQ ERROR
1621  006740  005000                            CLR     R0              ;R0=0
1622  006742  005010                            CLR     (R0)            ;LOC. 0=0
1623  006744  005110                            COM     (R0)            ;LOC. 0=177777
1624  006746  105100                            COMB    R0              ;R0=377
1625  006750  105470  000005                    NEGB    @5(R0)          ;R0+5=404,  404=1,  LOC. 0=777
1626  006754  100403                            BMI     NEG70           ;CC=0001?
1627  006756  001402                            BEQ     NEG70
1628  006760  102401                            BVS     NEG70
1629  006762  103406                            BCS     NEG71
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 765           <====
      006764                            NEG70:
      006764  012762  000144  177776            MOV     #144,-2(R2)     ;MOVE TO MAILBOX # ******* 144 *******
      006772  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      006776  000000                            HALT                    ;NEG DID NOT SET CC'S CORRECTLY
1630  007000  105100                    NEG71:  COMB    R0              ;R0=0
1631  007002  105120                            COMB    (R0)+           ;LOC. 0=400,  R0=1
1632  007004  105310                            DECB    (R0)            ;LOC. 0=0
1633  007006  005467  170766                    NEG     0               ;USE NEG MODE 67 TO TST FOR ZERO
1634  007012  001406                            BEQ     TST73
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 751           <====
      007014  012762  000145  177776            MOV     #145,-2(R2)     ;MOVE TO MAILBOX # ******* 145 *******
      007022  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      007026  000000                            HALT                    ;DATA RESULT OF NEG WAS INCORRECT
                                                                        ;  OR SEQUENCE ERROR
1635
1636                                    ;*****************************************************************************
1637                                    ;
1638                                    ;       THIS TEST VERIFIES PROGRAM COUNTER ADDRESSING WITH SOP
1639                                    ;INSTRUCTIONS.  CLR MODE 77 IS USED TO CLEAR THE LOCATION FOLLOWING THE
1640                                    ;INSTRUCTION (SOPX).  THEN SINGLE OPERAND INSTRUCTIONS WITH MODES 37, 67, AND
1641                                    ;77, USING INDIRECT POINTER SOPXAD ARE USED TO VERIFY THE DATA RESULTS
1642                                    ;OF THESE INSTRUCTIONS.
1643                                    ;
```

```
1644                                    .SBTTL  TEST # 73 - TEST SOP OPCODE MODES 2,3,6,7 WITH P.C.
                                        ;*****************************************************************************
                                        ;TEST 73 - TEST SOP OPCODE MODES 2,3,6,7 WITH P.C.
                                        ;*****************************************************************************
     007030  005212                     TST73:  INC     (R2)            ;UPDATE TEST NUMBER
     007032  022712  000073                     CMP     #73,(R2)        ;SEQUENCE ERROR?
     007036  001021                             BNE     SOPB            ;BR TO ERROR HALT ON SEQ ERROR
1645 007040  005027                             CLR     (R7)+           ;CLEAR NEXT LOCATION: (SOPX)
1646 007042  177777                     SOPX:   -1                      ;USE MODE 27
1647 007044  001406                             BEQ     SOPA
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 774           <====
     007046  012762  000146  177776             MOV     #146,-2(R2)     ;MOVE TO MAILBOX #  *******  146  *******
     007054  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     007060  000000                             HALT                    ;CLR DID NOT SET Z-BIT
1648 007062  005237  007042             SOPA:   INC     @#SOPX          ;INC SOPX W/MODE 37
1649 007066  005467  177750                     NEG     SOPX            ;NEGATE SOPX W/MODE 67
1650 007072  100003                             BPL     SOPB
1651 007074  005277  000016                     INC     @SOPXAD         ;INC SOPX W/MODE 77
1652 007100  001407                             BEQ     TST74
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 756           <====
     007102                             SOPB:
     007102  012762  000147  177776             MOV     #147,-2(R2)     ;MOVE TO MAILBOX #  *******  147  *******
     007110  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     007114  000000                             HALT                    ;INC DID NOT SET Z-BIT
                                                                        ;  OR SEQUENCE ERROR
1653 007116  007042                     SOPXAD: SOPX                    ;INDIRECT ADDRESS OF SOPX
1654
1655                                    ;*****************************************************************************
1656                                    ;
1657                                    ;       THIS TEST VERIFIES SINGLE OPERAND NON-MODIFYING INSTRUCTIONS
1658                                    ;USING MODE 0.  R0 IS SET TO ZERO AND THE CONDITION CODES ARE SET
1659                                    ;TO THE COMPLEMENT OF THAT EXPECTED BY THE INSTRUCTION.  A TST INSTRUCTION
1660                                    ;IS EXECUTED AND CONDITIONAL BRANCHES ARE USED TO TEST THE CONDITION
1661                                    ;CODES.
1662                                    ;
```

```
1663                                    .SBTTL  TEST # 74 - TEST MODE 0 SOP NON-MODIFYING
                                        ;*****************************************************************************
                                        ;TEST 74 - TEST MODE 0 SOP NON-MODIFYING
                                        ;*****************************************************************************
                                        ;
007120  005212                          TST74:  INC     (R2)            ;UPDATE TEST NUMBER
007122  022712  000074                          CMP     #74,(R2)        ;SEQUENCE ERROR?
007126  001012                                  BNE     TST75-10        ;BR TO ERROR HALT ON SEQ ERROR
1664 007130  005000                             CLR     R0              ;INITIALIZE R0=0
1665 007132  000277                             SCC                     ;SET CC=1011
1666 007134  000244                             CLZ
1667 007136  005700                             TST     R0              ;TRY TST W/ MODE 0
1668 007140  102403                             BVS     SNM0A           ;CHECK THAT CC=0100
1669 007142  100402                             BMI     SNM0A
1670 007144  103401                             BCS     SNM0A
1671 007146  001406                             BEQ     TST75
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 767           <====
007150                                  SNM0A:
007150  012762  000150  177776                  MOV     #150,-2(R2)     ;MOVE TO MAILBOX #  *******  150  *******
007156  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
007162  000000                                  HALT                    ;CONDITION CODES NOT SET PROPERLY
                                                                        ;  OR SEQUENCE ERROR
1672
1673                                    ;*****************************************************************************
1674                                    ;
1675                                    ;       THIS TEST VERIFIES SINGLE OPERAND NON-MODIFYING BYTE INSTRUCTIONS WITH MODE 0.
1676                                    ;R0 IS SET TO 377 AND COMPLEMENT OF THE EXPECTED CONDITION CODES
1677                                    ;IS LOADED IN PSW.  A TSTB INSTRUCTION IS EXECUTED AND THE RESULTS
1678                                    ;ARE CHECKED WITH SEVERAL CONDITIONAL BRANCH INSTRUCTIONS.
1679                                    ;       THIS VERIFIES THAT THE PROPER BYTE WAS TESTED.
1680                                    ;
```

```
1681                                    .SBTTL  TEST # 75 - TEST MODE 0 EVEN BYTE W/ SOP NON-MODIFYING
                                        ;*****************************************************************************
                                        ;TEST 75 - TEST MODE 0 EVEN BYTE W/ SOP NON-MODIFYING
                                        ;*****************************************************************************
007164  005212                        TST75:  INC     (R2)            ;UPDATE TEST NUMBER
007166  022712  000075                        CMP     #75,(R2)        ;SEQUENCE ERROR?
007172  001012                                BNE     TST76-10        ;BR TO ERROR HALT ON SEQ ERROR
1682 007174  005000                            CLR     R0              ;INITIALIZE
1683 007176  105100                            COMB    R0              ;R0=377
1684 007200  000277                            SCC                     ;SET CC=0111
1685 007202  000250                            CLN
1686 007204  105700                            TSTB    R0              ;TRY TST EVEN BYTE
1687 007206  102402                            BVS     SNMB0A          ;CHECK CC=1000
1688 007210  101401                            BLOS    SNMB0A
1689 007212  100406                            BMI     TST76
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                        ;           CONDITIONAL BRANCH INST. AND    <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                        ;           WHICH FOLLOWS W/ 767            <====
007214                                  SNMB0A:
007214  012762  000151  177776                MOV     #151,-2(R2)     ;MOVE TO MAILBOX # ******* 151 *******
007222  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
007226  000000                                HALT                    ;CONDITION CODES NOT SET PROPERLY
                                                                        ;  OR SEQUENCE ERROR
1690
1691                                    ;*****************************************************************************
1692                                    ;
1693                                    ;       THIS TEST VERIFIES SINGLE OPERAND INSTRUCTIONS WITH MODE 1.
1694                                    ;R0 IS USED TO POINT TO AND CLEAR LOC. 0.  THE COMPLEMENT OF THE
1695                                    ;EXPECTED CONDITION CODES ARE LOADED IN THE PSW.  A TST INSTRUCTION
1696                                    ;IS THEN EXECUTED ON LOC. 0 USING R0 AND CONDITIONAL BRANCHES TEST
1697                                    ;THE RESULTS.
1698                                    ;
```

```
1699                                    .SBTTL  TEST # 76 - TEST MODE 1 SOP NON-MODIFYING
                                        ;*************************************************************************
                                        ;TEST 76 - TEST MODE 1 SOP NON-MODIFYING
                                        ;*************************************************************************
                                        ;
 007230  005212                         TST76:  INC     (R2)            ;UPDATE TEST NUMBER
 007232  022712  000076                         CMP     #76,(R2)        ;SEQUENCE ERROR?
 007236  001013                                 BNE     TST77-10        ;BR TO ERROR HALT ON SEQ ERROR
1700 007240  005000                             CLR     R0              ;POINT TO LOC 0
1701 007242  005010                             CLR     (R0)            ;CLEAR LOC 0
1702 007244  000277                             SCC                     ;INITIALIZE
1703 007246  000244                             CLZ                     ;CC=1011
1704 007250  005710                             TST     (R0)            ;TRY TST W/ MODE 1
1705 007252  102403                             BVS     SNM1A           ;CHECK CC=0100
1706 007254  103402                             BCS     SNM1A
1707 007256  100401                             BMI     SNM1A
1708 007260  001406                             BEQ     TST77
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 766           <====
 007262                                 SNM1A:
 007262  012762  000152  177776                 MOV     #152,-2(R2)     ;MOVE TO MAILBOX #  *******  152  *******
 007270  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 007274  000000                                 HALT                    ;CC'S NOT SET PROPERLY
                                                                        ;  OR SEQUENCE ERROR
1709
1710                                    ;*************************************************************************
1711                                    ;
1712                                    ;       THIS TEST SETS LOCATION 0 TO 377 AND THEN USES R0 TO TEST
1713                                    ;THE EVEN BYTE AND THE ODD BYTE USING SOP BYTE INSTRUCTIONS WITH MODE 1.
1714                                    ;AGAIN, CONDITIONAL BRANCHES ARE USED TO VERIFY THE SETTING OF THE
1715                                    ;PROPER CONDITION CODE BITS.
1716                                    ;
```

```
 1717                                   .SBTTL  TEST # 77 - TEST MODE 1 BYTE INST. NON-MODIFYING
                                        ;*****************************************************************************
                                        ;TEST 77 - TEST MODE 1 BYTE INST. NON-MODIFYING
                                        ;*****************************************************************************
      007276  005212                    TST77:  INC     (R2)            ;UPDATE TEST NUMBER
      007300  022712  000077                    CMP     #77,(R2)        ;SEQUENCE ERROR?
      007304  001032                            BNE     TST100-10       ;BR TO ERROR HALT ON SEQ ERROR
 1718 007306  005000                            CLR     R0              ;POINT TO LOC 0
 1719 007310  005010                            CLR     (R0)            ;CLEAR LOC 0
 1720 007312  105110                            COMB    (R0)            ;COMPLEMENT BYTE 0
 1721 007314  000277                            SCC                     ;SET CC=0111
 1722 007316  000250                            CLN
 1723 007320  105710                            TSTB    (R0)            ;TRY TST ON EVEN BYTE
 1724 007322  102402                            BVS     SNMB1A
 1725 007324  101401                            BLOS    SNMB1A
 1726 007326  100406                            BMI     SNMB1B
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 766           <====
      007330                            SNMB1A:
      007330  012762  000153  177776            MOV     #153,-2(R2)     ;MOVE TO MAILBOX #  *******  153  *******
      007336  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      007342  000000                            HALT                    ;CC'S NOT CORRECT
 1727 007344  005000                    SNMB1B: CLR     R0
 1728 007346  005200                            INC     R0
 1729 007350  000277                            SCC                     ;SET CC=1011
 1730 007352  000244                            CLZ
 1731 007354  105710                            TSTB    (R0)            ;TRY TO TST AN ODD BYTE
 1732 007356  102403                            BVS     SNMB1C          ;CHECK CC=0100
 1733 007360  103402                            BCS     SNMB1C
 1734 007362  100401                            BMI     SNMB1C
 1735 007364  001406                            BEQ     TST100
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 747           <====
      007366                            SNMB1C:
      007366  012762  000154  177776            MOV     #154,-2(R2)     ;MOVE TO MAILBOX #  *******  154  *******
      007374  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      007400  000000                            HALT                    ;CC'S NOT CORRECT
                                                ;  OR SEQUENCE ERROR
 1736
 1737                                   ;*****************************************************************************
 1738                                   ;
 1739                                   ;       THIS TEST VERIFIES THE SINGLE-OPERAND NON-MODIFYING INSTRUCTIONS
 1740                                   ;USING MODE 2.  IT USES THE IDENTICAL PROCEDURE EMPLOYED IN THE
 1741                                   ;MODE 1 TESTS.  ADDITIONALLY, THE REGISTER IS CHECKED TO ASSURE THAT
 1742                                   ;IT IS INCREMENTED PROPERLY.
 1743                                   ;
```

```
1744                                    .SBTTL  TEST # 100 - TEST MODE 2 WITH SOP NON-MODIFYING
                                        ;*****************************************************************************
                                        ;TEST 100 - TEST MODE 2 WITH SOP NON-MODIFYING
                                        ;*****************************************************************************
007402  005212                        TST100: INC     (R2)            ;UPDATE TEST NUMBER
007404  022712  000100                        CMP     #100,(R2)       ;SEQUENCE ERROR?
007410  001024                            BNE     TST101-10       ;BR TO ERROR HALT ON SEQ ERROR
1745 007412  005000                        CLR     R0              ;INITIALIZE R0=0
1746 007414  005010                        CLR     (R0)            ;CLEAR LOC 0
1747 007416  000277                        SCC                     ;SET CC=1011
1748 007420  000244                        CLZ
1749 007422  005720                        TST     (R0)+           ;TRY TST W/ MODE 2
1750 007424  102403                        BVS     SNM2A           ;CHECK CC=0100
1751 007426  103402                        BCS     SNM2A
1752 007430  100401                        BMI     SNM2A
1753 007432  001406                        BEQ     SNM2B
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 766           <====
007434                                  SNM2A:
007434  012762  000155  177776                MOV     #155,-2(R2)     ;MOVE TO MAILBOX #  *******  155  *******
007442  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
007446  000000                            HALT                    ;CC'S NOT CORRECT
1754 007450  005300                    SNM2B:  DEC     R0              ;RESET R0
1755 007452  005300                        DEC     R0
1756 007454  001406                        BEQ     TST101
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 755           <====
007456  012762  000156  177776                MOV     #156,-2(R2)     ;MOVE TO MAILBOX #  *******  156  *******
007464  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
007470  000000                            HALT                    ;MODE 2 DID NOT INC REQ CORRECTLY
                                                                    ;  OR SEQUENCE ERROR
1757
1758                                    ;*****************************************************************************
1759                                    ;
1760                                    ;       THIS TEST VERIFIES MODE 2 SINGLE OPERAND NON-MODIFYING BYTE
1761                                    ;INSTRUCTIONS IT USES R0 TO POINT TO LOC. 0.  WITH LOCATION 0
1762                                    ;SET TO 377, THE EVEN AND ODD BYTE IS TESTED WITH TSTB INSTRUCTIONS
1763                                    ;TO VERIFY THE CORRECT CC ARE SET.  THE REGISTER IS CHECKED FOR
1764                                    ;PROPER INCREMENTING.
1765                                    ;
```

```
1766                                    .SBTTL  TEST # 101 - TEST MODE 2 - BYTE W/ SOP NON-MODIFYING
                                        ;*****************************************************************************
                                        ;TEST 101 - TEST MODE 2 - BYTE W/ SOP NON-MODIFYING
                                        ;*****************************************************************************
     007472  005212                     TST101: INC     (R2)            ;UPDATE TEST NUMBER
     007474  022712  000101                     CMP     #101,(R2)       ;SEQUENCE ERROR?
     007500  001052                             BNE     TST102-10       ;BR TO ERROR HALT ON SEQ ERROR
1767 007502  005000                             CLR     R0              ;CLEAR R0
1768 007504  005010                             CLR     (R0)            ;CLEAR LOC 0
1769 007506  105110                             COMB    (R0)            ;SET LOC 0=377
1770 007510  000277                             SCC                     ;SET CC=0111
1771 007512  000250                             CLN
1772 007514  105720                             TSTB    (R0)+           ;TRY TST OF EVEN BYTE
1773 007516  102402                             BVS     SNMB2A
1774 007520  101401                             BLOS    SNMB2A
1775 007522  100406                             BMI     SNMB2B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 766           <====
     007524                             SNMB2A:
     007524  012762  000157  177776             MOV     #157,-2(R2)     ;MOVE TO MAILBOX #  *******  157  *******
     007532  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     007536  000000                             HALT                    ;CC'S NOT SET CORRECTLY
1776 007540  005300                     SNMB2B: DEC     R0              ;DECREMENT R0
1777 007542  001406                             BEQ     SNMB2C
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 756           <====
     007544  012762  000160  177776             MOV     #160,-2(R2)     ;MOVE TO MAILBOX #  *******  160  *******
     007552  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     007556  000000                             HALT                    ;MODE 2 DID NOT INC REG CORRECTLY
1778 007560  005200                     SNMB2C: INC     R0              ;POINT TO ODD BYTE
1779 007562  000277                             SCC                     ;SET CC=1011
1780 007564  000244                             CLZ
1781 007566  105720                             TSTB    (R0)+           ;TRY TST OF ODD BYTE
1782 007570  102403                             BVS     SNMB2D          ;CHECK CC'S=0100
1783 007572  103402                             BCS     SNMB2D
1784 007574  100401                             BMI     SNMB2D
1785 007576  001406                             BEQ     SNMB2E
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 740           <====
     007600                             SNMB2D:
     007600  012762  000161  177776             MOV     #161,-2(R2)     ;MOVE TO MAILBOX #  *******  161  *******
     007606  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     007612  000000                             HALT                    ;CC'S NOT CORRECT
1786 007614  005300                     SNMB2E: DEC     R0
1787 007616  005300                             DEC     R0
1788 007620  001406                             BEQ     TST102
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 727           <====
     007622  012762  000162  177776             MOV     #162,-2(R2)     ;MOVE TO MAILBOX #  *******  162  *******
```

```
007630  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
007634  000000                         HALT                    ;R0 DID NOT INCREMENT PROPERLY
                                                               ;  OR SEQUENCE ERROR

1789
1790                    ;*****************************************************************************
1791                    ;
1792                    ;       THIS TEST VERIFIES MODE 3 SINGLE OPERAND NON-MODIFYING INSTRUCTIONS.
1793                    ;A POINTER IN A TABLE AT LOC. 376 IS USED TO TEST LOCATION 0.
1794                    ;THE CC'S AND THE REGISTER ARE CHECKED FOLLOWING THE
1795                    ;TST MODE 3 INSTRUCTION.
1796                    ;
```

```
1797                                    .SBTTL  TEST # 102 - TEST MODE 3 W/ SOP NON-MODIFYING INSTS
                                        ;*****************************************************************************
                                        ;TEST 102 - TEST MODE 3 W/ SOP NON-MODIFYING INSTS
                                        ;*****************************************************************************
 007636  005212                       TST102: INC     (R2)            ;UPDATE TEST NUMBER
 007640  022712  000102                       CMP     #102,(R2)       ;SEQUENCE ERROR?
 007644  001026                              BNE     TST103-10       ;BR TO ERROR HALT ON SEQ ERROR
1798 007646  005000                          CLR     R0              ;R0=0
1799 007650  005010                          CLR     (R0)            ;CLEAR LOC 0
1800 007652  105100                          COMB    R0              ;R0=376
1801 007654  005300                          DEC     R0
1802 007656  000277                          SCC                     ;SET CC=1011
1803 007660  000244                          CLZ
1804 007662  005730                          TST     @(R0)+          ;TRY TST W/ MODE 3
1805 007664  102403                          BVS     SNM3A           ;CHECK CC=0100
1806 007666  103402                          BCS     SNM3A
1807 007670  100401                          BMI     SNM3A
1808 007672  001406                          BEQ     SNM3B
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                     ;           CONDITIONAL BRANCH INST. AND   <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                     ;           WHICH FOLLOWS W/ 764           <====
 007674                                 SNM3A:
 007674  012762  000163  177776              MOV     #163,-2(R2)     ;MOVE TO MAILBOX #  *******  163  *******
 007702  005262  177774                      INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 007706  000000                              HALT                    ;CC'S NOT CORRECT
1809 007710  005300                     SNM3B: DEC     R0              ;R0=377
1810 007712  105100                          COMB    R0              ;R0=0
1811 007714  001406                          BEQ     TST103
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                     ;           CONDITIONAL BRANCH INST. AND   <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                     ;           WHICH FOLLOWS W/ 753           <====
 007716  012762  000164  177776              MOV     #164,-2(R2)     ;MOVE TO MAILBOX #  *******  164  *******
 007724  005262  177774                      INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 007730  000000                              HALT                    ;MODE 3 DID NOT INC REG CORRECTLY
                                                                     ;  OR SEQUENCE ERROR
1812
1813                                    ;*****************************************************************************
1814                                    ;
1815                                    ;       THIS TEST VERIFIES SOP NON-MODIFYING BYTE INSTRUCTIONS MODE 3
1816                                    ;LOC. 0 IS SET TO 377.  TABLE AT LOC. 402-404 IS USED TO TEST
1817                                    ;BYTE 0 AND BYTE 1.  THE REGISTER IS CHECKED FOR PROPER INCREMENTING AND
1818                                    ;THE CC'S ARE VERIFIED.
1819                                    ;       THE TABLE AT LOC. 402-404 SHOULD CONTAIN 0 AND 1 BEFORE AND
1820                                    ;AFTER THE TEST IS RUN.
1821                                    ;
```

```
1822                                    .SBTTL  TEST # 103 - TEST MODE 3 - BYTES W/ SOP NON-MODIFYING INSTS.
                                        ;*****************************************************************************
                                        ;TEST 103 - TEST MODE 3 - BYTES W/ SOP NON-MODIFYING INSTS.
                                        ;*****************************************************************************
                                        ;
      007732  005212                    TST103: INC     (R2)            ;UPDATE TEST NUMBER
      007734  022712  000103                    CMP     #103,(R2)       ;SEQUENCE ERROR?
      007740  001044                            BNE     TST104-10       ;BR TO ERROR HALT ON SEQ ERROR
1823  007742  005000                            CLR     R0              ;R0=0
1824  007744  005010                            CLR     (R0)            ;CLEAR LOC 0
1825  007746  105110                            COMB    (R0)            ;LOC. 0 =377
1826  007750  105100                            COMB    R0
1827  007752  005200                            INC     R0
1828  007754  005720                            TST     (R0)+           ;R0=402
1829  007756  000277                            SCC                     ;CC=0111
1830  007760  000250                            CLN
1831  007762  105730                            TSTB    @(R0)+          ;TRY TST OF EVEN BYTE
1832  007764  102402                            BVS     SNMB3A          ;CHECK CC=1000
1833  007766  101401                            BLOS    SNMB3A
1834  007770  100406                            BMI     SNMB3B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 763           <====
      007772                            SNMB3A:
      007772  012762  000165  177776            MOV     #165,-2(R2)     ;MOVE TO MAILBOX #  *******  165  *******
      010000  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      010004  000000                            HALT                    ;CC'S NOT CORRECT
1835  010006  000277                    SNMB3B: SCC                     ;SET CC=1011
1836  010010  000244                            CLZ
1837  010012  105730                            TSTB    @(R0)+          ;TRY TST OF ODD BYTE
1838  010014  102403                            BVS     SNMB3C          ;CHECK CC=0100
1839  010016  103402                            BCS     SNMB3C
1840  010020  100401                            BMI     SNMB3C
1841  010022  001406                            BEQ     SNMB3D
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 746           <====
      010024                            SNMB3C:
      010024  012762  000166  177776            MOV     #166,-2(R2)     ;MOVE TO MAILBOX #  *******  166  *******
      010032  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      010036  000000                            HALT                    ;CC'S NOT CORRECT
1842  010040  005720                    SNMB3D: TST     (R0)+           ;R0=410
1843  010042  005710                            TST     (R0)
1844  010044  100406                            BMI     TST104
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 735           <====
      010046  012762  000167  177776            MOV     #167,-2(R2)     ;MOVE TO MAILBOX #  *******  167  *******
      010054  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      010060  000000                            HALT                    ;TSTB DID NOT INCREMENT R0 CORRETCLY
                                                                        ;  OR SEQUENCE ERROR
1845                                    ;*****************************************************************************
1846                                    ;
1847                                    ;       THIS TEST VERIFIES MODE 4 SOP NON-MODIFYING INSTRUCTIONS.
1848                                    ;LOC. 0 IS SET TO -1 AND THE CC'S ARE SET TO THE COMPLEMENT OF THE
```

```
1849                                    ;EXPECTED RESULTS.  R0 AND SET TO 2 AND A TST MODE 4 IS EXECUTED.
1850                                    ;THE CC'S ARE CHECKED WITH CONDITIONAL BRANCH INSTRUCTIONS AND THE REGISTER
1851                                    ;IS CHECKED FOR PROPER DECREMENTING.
1852                                    ;
```

```
1853                                    .SBTTL  TEST # 104 - TEST MODE 4 W/ SOP NON-MODIFYING INSTS
                                        ;*************************************************************************
                                        ;TEST 104 - TEST MODE 4 W/ SOP NON-MODIFYING INSTS
                                        ;*************************************************************************
                                        ;
      010062  005212                    TST104: INC     (R2)            ;UPDATE TEST NUMBER
      010064  022712  000104                    CMP     #104,(R2)       ;SEQUENCE ERROR?
      010070  001023                            BNE     TST105-10       ;BR TO ERROR HALT ON SEQ ERROR
1854  010072  005000                            CLR     R0              ;R0=0
1855  010074  005010                            CLR     (R0)            ;LOC 0=0
1856  010076  005120                            COM     (R0)+           ;LOC 0=-1
1857  010100  000277                            SCC                     ;SET CC=1011
1858  010102  000244                            CLZ
1859  010104  005740                            TST     -(R0)           ;TRY TST W/ MODE 4
1860  010106  102402                            BVS     SNM4A           ;CHECK CC=0100
1861  010110  101401                            BLOS    SNM4A
1862  010112  100406                            BMI     SNM4B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 766           <====
      010114                            SNM4A:
      010114  012762  000170  177776            MOV     #170,-2(R2)     ;MOVE TO MAILBOX #  *******  170  *******
      010122  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      010126  000000                            HALT                    ;CC'S NOT CORRECT
1863  010130  005700                    SNM4B:  TST     R0
1864  010132  001406                            BEQ     TST105
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 756           <====
      010134  012762  000171  177776            MOV     #171,-2(R2)     ;MOVE TO MAILBOX #  *******  171  *******
      010142  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      010146  000000                            HALT                    ;TST MODE 4 DID NOT DEC R0 CORRECTLY
                                                                        ;  OR SEQUENCE ERROR
1865
1866                                    ;*************************************************************************
1867                                    ;
1868                                    ;       THIS TEST VERIFIES MODE 5 SOP NON-MODIFYING INSTRUCTIONS.
1869                                    ;IT USES A POINTER AT LOC. 376 TO TEST LOC. 0.  R0 IS SET
1870                                    ;TO 400, A TST MODE 5 INSTRUCTION IS EXECUTED AND THE CC'S CHECKED.
1871                                    ;R0 IS CHECKED TO INSURE PROPER DECREMENTING.
1872                                    ;
```

```
1873                                    .SBTTL  TEST # 105 - TEST MODE 5 W/ SOP NON-MODIFYING INSTS
                                        ;*****************************************************************************
                                        ;TEST 105 - TEST MODE 5 W/ SOP NON-MODIFYING INSTS
                                        ;*****************************************************************************
                                        ;
      010150  005212                    TST105: INC     (R2)            ;UPDATE TEST NUMBER
      010152  022712  000105                    CMP     #105,(R2)       ;SEQUENCE ERROR?
      010156  001026                            BNE     TST106-10       ;BR TO ERROR HALT ON SEQ ERROR
1874  010160  005000                            CLR     R0              ;R0=0
1875  010162  005010                            CLR     (R0)            ;LOC 0=0
1876  010164  005110                            COM     (R0)            ;LOC 0=-1
1877  010166  105100                            COMB    R0              ;R0=377
1878  010170  005200                            INC     R0              ;R0=400
1879  010172  000277                            SCC                     ;SET CC=0111
1880  010174  000250                            CLN
1881  010176  005750                            TST     @-(R0)          ;TRY TST W/ MODE 5
1882  010200  102402                            BVS     SNM5A           ;CHECK CC=1000
1883  010202  101401                            BLOS    SNM5A
1884  010204  100406                            BMI     SNM5B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
      010206                            SNM5A:
      010206  012762  000172  177776            MOV     #172,-2(R2)     ;MOVE TO MAILBOX #  *******  172  *******
      010214  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      010220  000000                            HALT                    ;CC'S NOT SET PROPERLY
1885  010222  005200                    SNM5B:  INC     R0              ;R0=377
1886  010224  105100                            COMB    R0              ;R0=0
1887  010226  001406                            BEQ     TST106
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 753           <====
      010230  012762  000173  177776            MOV     #173,-2(R2)     ;MOVE TO MAILBOX #  *******  173  *******
      010236  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      010242  000000                            HALT                    ;MODE 5 DID NOT DEC R0 CORRECTLY
                                                                        ;  OR SEQUENCE ERROR
1888
1889                                    ;*****************************************************************************
1890                                    ;
1891                                    ;       THIS TEST VERIFIES MODE 6 SOP NON-MODIFYING INSTRUCTIONS.
1892                                    ;R0 IS SET TO 377 AND A MODE 6 TST INSTRUCTION IS EXECUTED
1893                                    ;USING R0 AND AN OFFSET OF -377.  THE CC'S ARE CHECKED AS WELL
1894                                    ;AS R0 TO INSURE IT WAS NOT ALTERED.
1895                                    ;
```

```
 1896                                   .SBTTL  TEST # 106 - TEST MODE 6 W/ SOP NON-MODIFYING INSTS
                                        ;*****************************************************************************
                                        ;TEST 106 - TEST MODE 6 W/ SOP NON-MODIFYING INSTS
                                        ;*****************************************************************************
      010244  005212                    TST106: INC     (R2)            ;UPDATE TEST NUMBER
      010246  022712  000106                    CMP     #106,(R2)       ;SEQUENCE ERROR?
      010252  001025                            BNE     TST107-10       ;BR TO ERROR HALT ON SEQ ERROR
 1897 010254  005000                            CLR     R0              ;R0=0
 1898 010256  005010                            CLR     (R0)            ;LOC 0=0
 1899 010260  005110                            COM     (R0)            ;LOC 0=-1
 1900 010262  105100                            COMB    R0              ;R0=377
 1901 010264  000277                            SCC                     ;SET CC=0111
 1902 010266  000250                            CLN
 1903 010270  005760  177401                    TST     -377(R0)        ;TRY TST W/ MODE 6
 1904 010274  102402                            BVS     SNM6A           ;CHECK CC=1000
 1905 010276  101401                            BLOS    SNM6A
 1906 010300  100406                            BMI     SNM6B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
      010302                            SNM6A:
      010302  012762  000174  177776            MOV     #174,-2(R2)     ;MOVE TO MAILBOX # ******* 174 *******
      010310  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      010314  000000                            HALT                    ;CC'S INCORRECT
 1907 010316  105100                    SNM6B:  COMB    R0              ;R0=0
 1908 010320  001406                            BEQ     TST107
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 754           <====
      010322  012762  000175  177776            MOV     #175,-2(R2)     ;MOVE TO MAILBOX # ******* 175 *******
      010330  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      010334  000000                            HALT                    ;TST MODE 6 INCORRECTLY CHANGED R0
                                                                        ;  OR SEQUENCE ERROR
 1909
 1910                                   ;*****************************************************************************
 1911                                   ;
 1912                                   ;       THIS TEST VERIFIES MODE 7 SOP NON-MODIFYING INSTRUCTIONS.
 1913                                   ;IT USES A POINTER TO LOC. 0 STORED AT LOC. 400 TO TST LOC. 0.
 1914                                   ;R0 IS SET TO 377 AND LOC. 0 IS TESTED THRU THE POINTER AT 400 USING
 1915                                   ;R0 AND AN OFFSET OF 1.
 1916                                   ;
```

```
1917                                    .SBTTL  TEST # 107 - TEST MODE 7 W/ SOP NON-MODIFYING INSTS.
                                        ;*****************************************************************************
                                        ;TEST 107 - TEST MODE 7 W/ SOP NON-MODIFYING INSTS.
                                        ;*****************************************************************************
 010336  005212                       TST107: INC     (R2)            ;UPDATE TEST NUMBER
 010340  022712  000107                       CMP     #107,(R2)       ;SEQUENCE ERROR?
 010344  001025                              BNE     TST110-10       ;BR TO ERROR HALT ON SEQ ERROR
1918 010346  005000                          CLR     R0              ;R0=0
1919 010350  005010                          CLR     (R0)            ;LOC 0=0
1920 010352  005110                          COM     (R0)            ;LOC 0=-1
1921 010354  105100                          COMB    R0              ;R0=377
1922 010356  000277                          SCC                     ;CC=0111
1923 010360  000250                          CLN
1924 010362  005770  000001                  TST     @1(R0)          ;TRY TST W/ MODE 7
1925 010366  102402                          BVS     SNM7A           ;CHECK CC=1000
1926 010370  101401                          BLOS    SNM7A
1927 010372  100406                          BMI     SNM7B
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                     ;           CONDITIONAL BRANCH INST. AND   <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                     ;           WHICH FOLLOWS W/ 764           <====
 010374                                 SNM7A:
 010374  012762  000176  177776              MOV     #176,-2(R2)     ;MOVE TO MAILBOX #  *******  176  *******
 010402  005262  177774                      INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 010406  000000                              HALT                    ;CC'S NOT CORRECT
1928 010410  105100                  SNM7B:  COMB    R0              ;R0=0
1929 010412  001406                          BEQ     TST110
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                     ;           CONDITIONAL BRANCH INST. AND   <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                     ;           WHICH FOLLOWS W/ 754           <====
 010414  012762  000177  177776              MOV     #177,-2(R2)     ;MOVE TO MAILBOX #  *******  177  *******
 010422  005262  177774                      INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 010426  000000                              HALT                    ;TST MODE 7 INCORRECTLY CHANGED R0
                                                                     ;  OR SEQUENCE ERROR
1930
1931                                    ;*****************************************************************************
1932                                    ;
1933                                    ;       THIS TEST VERIFIES MODE 0 DOUBLE OPERAND INSTRUCTIONS.  IT SETS
1934                                    ;DATA IN R0 AND R4 AND USES THE ADD INSTRUCTION TO TEST THE DOP
1935                                    ;MICROCODE.
1936                                    ;
```

TEST # 110 - TEST MODE 0 DOUBLE-OPERAND (DOP) INSTS.

```
1937                                    .SBTTL  TEST # 110 - TEST MODE 0 DOUBLE-OPERAND (DOP) INSTS.
                                        ;*****************************************************************************
                                        ;TEST 110 - TEST MODE 0 DOUBLE-OPERAND (DOP) INSTS.
                                        ;*****************************************************************************
010430  005212                        TST110: INC     (R2)            ;UPDATE TEST NUMBER
010432  022712  000110                        CMP     #110,(R2)       ;SEQUENCE ERROR?
010436  001010                                BNE     TST111-10       ;BR TO ERROR HALT ON SEQ ERROR
1938 010440  005000                         CLR     R0              ;R0=0
1939 010442  005100                         COM     R0              ;R0=-1
1940 010444  005004                         CLR     R4              ;R4=0
1941 010446  060004                         ADD     R0,R4           ;TRY ADD: R4=-1
1942 010450  005204                         INC     R4              ;R4=0
1943 010452  001406                         BEQ     TST111
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 771           <====
010454  012762  000200  177776            MOV     #200,-2(R2)     ;MOVE TO MAILBOX #  *******  200  *******
010462  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
010466  000000                            HALT                    ;ADD INST. FAILED W/ MODE 0
                                                                    ;  OR SEQUENCE ERROR
1944
1945                                    ;*****************************************************************************
1946                                    ;
1947                                    ;       THIS TEST VERIFIES THE MOVE INSTRUCTION WITH MODE 0 TO MODE 0.
1948                                    ;THIS TEST IS NECESSARY BECAUSE THIS PARTICULAR INSTRUCTION UTILIZES UNIQUE
1949                                    ;MICROCODE.
1950                                    ;
```

```
1951                                    .SBTTL  TEST # 111 - MOV MODE 0 TO MODE 0
                                        ;*****************************************************************************
                                        ;TEST 111 - MOV MODE 0 TO MODE 0
                                        ;*****************************************************************************
                                        TST111: INC     (R2)            ;UPDATE TEST NUMBER
010470  005212                                 CMP     #111,(R2)       ;SEQUENCE ERROR?
010472  022712  000111                         BNE     TST112-10       ;BR TO ERROR HALT ON SEQ ERROR
010476  001010                                 CLR     R0              ;R0=0
1952 010500  005000                            CLR     R4              ;R4=0
1953 010502  005004                            COM     R0              ;R0=-1
1954 010504  005100                            MOV     R0,R4           ;TRY MOVE -1 TO R4
1955 010506  010004                            INC     R4              ;INC R4
1956 010510  005204                            BEQ     TST112
1957 010512  001406                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 771           <====
010514  012762  000201  177776                MOV     #201,-2(R2)     ;MOVE TO MAILBOX #  *******  201  *******
010522  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
010526  000000                                 HALT                    ;MOVE FAILED MODE 0 TO MODE 0
                                                                       ;  OR SEQUENCE ERROR
1958
1959                                    ;*****************************************************************************
1960                                    ;
1961                                    ;       THIS TEST VERIFIES THE SUBTRACT INSTRUCTION WITH MODE 0,0.
1962                                    ;THIS TEST IS NECESSARY BECAUSE THIS PARTICULAR INSTRUCTION UTILIZES SOME
1963                                    ;UNIQUE MICROCODE.
1964                                    ;
```

```
1965                                    .SBTTL  TEST # 112 - TEST SUB MODE 0,0
                                        ;*****************************************************************************
                                        ;TEST 112 - TEST SUB MODE 0,0
                                        ;*****************************************************************************
     010530  005212                     TST112: INC     (R2)            ;UPDATE TEST NUMBER
     010532  022712  000112                     CMP     #112,(R2)       ;SEQUENCE ERROR?
     010536  001022                             BNE     TST113-10       ;BR TO ERROR HALT ON SEQ ERROR
1966 010540  005000                             CLR     R0              ;R0=0
1967 010542  005004                             CLR     R4              ;R4=0
1968 010544  005204                             INC     R4              ;R4=1
1969 010546  160400                             SUB     R4,R0           ;TRY SUB 0,0   R0=-1
1970 010550  100003                             BPL     SUB0            ;CC=1001
1971 010552  001402                             BEQ     SUB0
1972 010554  102401                             BVS     SUB0
1973 010556  103406                             BCS     SUB0A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 767           <====
     010560                             SUB0:
     010560  012762  000202  177776             MOV     #202,-2(R2)     ;MOVE TO MAILBOX #  *******  202  *******
     010566  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     010572  000000                             HALT                    ;CONDITION CODE FAILED ON SUB
1974 010574  005200                     SUB0A:  INC     R0
1975 010576  001406                             BEQ     TST113
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 757           <====
     010600  012762  000203  177776             MOV     #203,-2(R2)     ;MOVE TO MAILBOX #  *******  203  *******
     010606  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     010612  000000                             HALT                    ;DATA RESULT OF SUB FAILED
                                                                        ;  OR SEQUENCE ERROR
1976
1977                                    ;*****************************************************************************
1978                                    ;
1979                                    ;       THIS TEST QUICKLY VERIFIES THE REMAINING DOP MODIFYING INSTRUCTIONS
1980                                    ;WITH MODE 0,0 TO PROVIDE A BASELINE FOR SUBSEQUENT TESTS.
1981                                    ;SINGLE OPERAND INSTRUCTIONS ARE USED TO SET UP DATA IN R0 AND R4
1982                                    ;BEFORE EACH OF THE SEVERAL DOP MODIFYING INSTRUCTIONS ARE USED AND
1983                                    ;VERIFIED.
1984                                    ;
```

```
 1985                                   .SBTTL  TEST # 113 - TEST ALL THE DOP INSTRUCTIONS W/ SOURCE MODE 0,0
                                        ;*****************************************************************************
                                        ;TEST 113 - TEST ALL THE DOP INSTRUCTIONS W/ SOURCE MODE 0,0
                                        ;*****************************************************************************
      010614  005212                    TST113: INC     (R2)            ;UPDATE TEST NUMBER
      010616  022712  000113                    CMP     #113,(R2)       ;SEQUENCE ERROR?
      010622  001063                            BNE     TST114-10       ;BR TO ERROR HALT ON SEQ ERROR
 1986 010624  005000                            CLR     R0              ;R0=0
 1987 010626  010004                            MOV     R0,R4           ;TRY MOVE MODE 0,0
 1988 010630  001406                            BEQ     DOP0A
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 774           <====
      010632  012762  000204  177776            MOV     #204,-2(R2)     ;MOVE TO MAILBOX #  *******  204  *******
      010640  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      010644  000000                            HALT                    ;Z-BIT NOT SET
 1989 010646  005200                    DOP0A:  INC     R0              ;R0=1
 1990 010650  005100                            COM     R0              ;R0=177776
 1991 010652  005104                            COM     R4              ;R4=177777
 1992 010654  040004                            BIC     R0,R4           ;TRY BIC: R4=1
 1993 010656  005304                            DEC     R4              ;R4=0
 1994 010660  001406                            BEQ     DOP0B
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 760           <====
      010662  012762  000205  177776            MOV     #205,-2(R2)     ;MOVE TO MAILBOX #  *******  205  *******
      010670  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      010674  000000                            HALT                    ;BIC CLEAR RESULT INCORRECT
 1995 010676  050004                    DOP0B:  BIS     R0,R4           ;TRY BIS: R4=177777
 1996 010700  005204                            INC     R4
 1997 010702  005204                            INC     R4              ;R4=0
 1998 010704  001406                            BEQ     DOP0C
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 746           <====
      010706  012762  000206  177776            MOV     #206,-2(R2)     ;MOVE TO MAILBOX #  *******  206  *******
      010714  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      010720  000000                            HALT                    ;RESULT OF BIS INCORRECT
 1999 010722  005000                    DOP0C:  CLR     R0              ;R0=0
 2000 010724  105100                            COMB    R0              ;R0=377
 2001 010726  005004                            CLR     R4              ;R4=0
 2002 010730  005104                            COM     R4              ;R4=177777
 2003 010732  040004                            BIC     R0,R4           ;R4=177400
 2004 010734  060004                            ADD     R0,R4           ;TRY ADD: R4=177777
 2005 010736  005204                            INC     R4              ;R4=0
 2006 010740  001406                            BEQ     DOP0D
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 730           <====
      010742  012762  000207  177776            MOV     #207,-2(R2)     ;MOVE TO MAILBOX #  *******  207  *******
      010750  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      010754  000000                            HALT                    ;RESULT OF ADD INCORRECT
 2007 010756  160004                    DOP0D:  SUB     R0,R4           ;177401=R4
```

```
2008 010760  105404                          NEGB    R4              ;R4=177777
2009 010762  005204                          INC     R4              ;RD=0
2010 010764  001406                          BEQ     TST114
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                     ;           CONDITIONAL BRANCH INST. AND   <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                     ;           WHICH FOLLOWS W/ 716           <====
     010766  012762  000210  177776          MOV     #210,-2(R2)     ;MOVE TO MAILBOX #  *******  210  *******
     010774  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     011000  000000                          HALT                    ;RESULT OF SUB INCORRECT
                                                                     ;  OR SEQUENCE ERROR
2011
2012                                 ;*************************************************************************************
2013                                 ;
2014                                 ;       THIS TEST VERIFIES MODE 0,X DOUBLE OPERAND INSTRUCTIONS.  IT SETS
2015                                 ;DATA IN R0 AND LOCATION 0 AND OPERATES UPON IT USING DOP INSTRUCTIONS.
2016                                 ;
```

```
2017                                    .SBTTL  TEST # 114 - TEST MODE 0,X DOUBLE-OPERAND INSTRUCTIONS
                                        ;*****************************************************************************
                                        ;TEST 114 - TEST MODE 0,X DOUBLE-OPERAND INSTRUCTIONS
                                        ;*****************************************************************************
     011002  005212                     TST114: INC     (R2)            ;UPDATE TEST NUMBER
     011004  022712  000114                     CMP     #114,(R2)       ;SEQUENCE ERROR?
     011010  001030                             BNE     TST115-10       ;BR TO ERROR HALT ON SEQ ERROR
2018 011012  005000                             CLR     R0              ;R0=0
2019 011014  005010                             CLR     (R0)            ;LOC. 0=0
2020 011016  105110                             COMB    (R0)            ;LOC. 0=377
2021 011020  005220                             INC     (R0)+           ;LOC. 0=400   R0=2
2022 011022  005400                             NEG     R0              ;R0=-2
2023 011024  060037  000000                     ADD     R0,@#0          ;TRY ADD 0,3;  LOC. 0=376
2024 011030  100403                             BMI     DOP03A          ;CC=0001?
2025 011032  001402                             BEQ     DOP03A
2026 011034  102401                             BVS     DOP03A
2027 011036  103406                             BCS     DOP03B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
     011040                             DOP03A:
     011040  012762  000211  177776             MOV     #211,-2(R2)     ;MOVE TO MAILBOX #  *******  211  *******
     011046  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     011052  000000                             HALT                    ;CC'S NOT SET CORRECTLY
2028 011054  105137  000000             DOP03B: COMB    @#0             ;LOC. 0=1
2029 011060  005337  000000                     DEC     @#0             ;LOC. 0=0
2030 011064  001406                             BEQ     TST115
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 751           <====
     011066  012762  000212  177776             MOV     #212,-2(R2)     ;MOVE TO MAILBOX #  *******  212  *******
     011074  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     011100  000000                             HALT                    ;DATA RESULT INCORRECT
                                                                        ;  OR SEQUENCE ERROR
2031                                    ;*****************************************************************************
2032                                    ;
2033                                    ;       THIS TEST VERIFIES MODE 0,0 DOP NON-MODIFYING INSTRUCTIONS.
2034                                    ;R0 AND R4 ARE PRESET TO 0 AND 1 RESPECTIVELY.  COMPARE INSTRUCTIONS ARE
2035                                    ;THEN EXECUTED AND CHECKED.  FIRST R4 IS COMPARED TO R0 THEN R0 TO R4.
2036                                    ;
```

```
                                .SBTTL  TEST # 115 - TEST DOP NON-MODIFYING INST. W/ SOURCE MODE 0,0
                                ;*****************************************************************************
                                ;TEST 115 - TEST DOP NON-MODIFYING INST. W/ SOURCE MODE 0,0
                                ;*****************************************************************************
011102  005212                  TST115: INC     (R2)            ;UPDATE TEST NUMBER
011104  022712  000115                  CMP     #115,(R2)       ;SEQUENCE ERROR?
011110  001054                          BNE     TST116-10       ;BR TO ERROR HALT ON SEQ ERROR
2038 011112  005000                     CLR     R0              ;R0=0
2039 011114  005004                     CLR     R4              ;R4=0
2040 011116  005204                     INC     R4              ;R4=1
2041 011120  020400                     CMP     R4,R0           ;TRY COMPARE R4 TO R0
2042 011122  003006                     BGT     DNM1
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 772           <====
011124  012762  000213  177776          MOV     #213,-2(R2)     ;MOVE TO MAILBOX #  *******  213  *******
011132  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
011136  000000                          HALT                    ;CC'S NOT CORRECT FOR CMP
2043 011140  020004             DNM1:   CMP     R0,R4           ;TRY COMPARE R0 TO R4
2044 011142  002406                     BLT     DNM2
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 762           <====
011144  012762  000214  177776          MOV     #214,-2(R2)     ;MOVE TO MAILBOX #  *******  214  *******
011152  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
011156  000000                          HALT                    ;CC'S NOT CORRECT FOR CMP
2045 011160  005200             DNM2:   INC     R0              ;R0=1
2046 011162  020400                     CMP     R4,R0           ;TRY COMPARE R4=1 TO R0=1
2047 011164  001406                     BEQ     DNM3
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 751           <====
011166  012762  000215  177776          MOV     #215,-2(R2)     ;MOVE TO MAILBOX #  *******  215  *******
011174  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
011200  000000                          HALT                    ;CC'S NOT CORRECT (Z=1) FOR CMP
2048 011202  005000             DNM3:   CLR     R0              ;R0=0
2049 011204  005100                     COM     R0              ;R0=177777
2050 011206  005004                     CLR     R4              ;R4=0
2051 011210  030004                     BIT     R0,R4           ;TRY BIT R0 TO R4
2052 011212  001406                     BEQ     DNM4
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 736           <====
011214  012762  000216  177776          MOV     #216,-2(R2)     ;MOVE TO MAILBOX #  *******  216  *******
011222  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
011226  000000                          HALT                    ;CC'S NOT CORRECT FOR BIT
2053 011230  005304             DNM4:   DEC     R4              ;R4=177777
2054 011232  030004                     BIT     R0,R4           ;TRY BIT AGAIN
2055 011234  100406                     BMI     TST116
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 725           <====
```

```
011236  012762  000217  177776          MOV     #217,-2(R2)     ;MOVE TO MAILBOX #  *******  217  *******
011244  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
011250  000000                          HALT                    ;CC'S NOT CORRECT FOR BIT
                                                                ;  OR SEQUENCE ERROR
2056                            ;*************************************************************************
2057                            ;
2058                            ;       THIS TEST VERIFIES MODE 0,X DOUBLE OPERAND NON-MODIFYING INSTRUCTIONS.
2059                            ;IT SETS DATA IN R0 AND LOCATION 0 AND COMPARES THEM USING DOPNM INSTRUCTIONS.
2060                            ;
```

```
2061                                    .SBTTL  TEST # 116 - TEST MODE 0,X DOUBLE-OPERAND NON-MODIFYING INSTS.
                                        ;*****************************************************************************
                                        ;TEST 116 - TEST MODE 0,X DOUBLE-OPERAND NON-MODIFYING INSTS.
                                        ;*****************************************************************************
011252  005212                          TST116: INC     (R2)            ;UPDATE TEST NUMBER
011254  022712  000116                          CMP     #116,(R2)       ;SEQUENCE ERROR?
011260  001026                                  BNE     TST117-10       ;BR TO ERROR HALT ON SEQ ERROR
2062 011262  005000                             CLR     R0              ;R0=0
2063 011264  005010                             CLR     (R0)            ;LOC. 0=0
2064 011266  005110                             COM     (R0)            ;LOC. 0=177777
2065 011270  005200                             INC     R0              ;R0=1
2066 011272  020037  000000                     CMP     R0,@#0          ;TRY CMP MODE 0,3
2067 011276  100403                             BMI     DNM03A          ;CC=0001
2068 011300  001402                             BEQ     DNM03A
2069 011302  102401                             BVS     DNM03A
2070 011304  103406                             BCS     DNM03B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 765           <====
011306                                  DNM03A:
011306  012762  000220  177776                  MOV     #220,-2(R2)     ;MOVE TO MAILBOX #  *******  220  *******
011314  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
011320  000000                                  HALT                    ;CC'S NOT SET CORRECTLY
2071 011322  005300                     DNM03B: DEC     R0
2072 011324  001002                             BNE     DNM03C
2073 011326  005210                             INC     (R0)
2074 011330  001406                             BEQ     TST117
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 753           <====
011332                                  DNM03C:
011332  012762  000221  177776                  MOV     #221,-2(R2)     ;MOVE TO MAILBOX #  *******  221  *******
011340  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
011344  000000                                  HALT                    ;DATA INCORRECTLY MODIFIED BY CMP
                                                                        ;  OR SEQUENCE ERROR
2075                                    ;*****************************************************************************
2076                                    ;
2077                                    ;       THIS TEST VERIFIES MODE 1 DOP INSTRUCTIONS.  R0 IS SET TO -1
2078                                    ;AND LOC 0 TO 1.  R4 IS THEN CLEARED AND USED TO POINT TO LOC 0.
2079                                    ;IN THE ADD MODE 1 INSTRUCTION, LOC 0 IS ADDED TO R0 AND THE
2080                                    ;RESULTS VERIFIED.
2081                                    ;
```

```
2082                                    .SBTTL  TEST # 117 - TEST MODE 1 W/ DOP INST.
                                        ;*****************************************************************************
                                        ;TEST 117 - TEST MODE 1 W/ DOP INST.
                                        ;*****************************************************************************
        011346  005212                  TST117: INC     (R2)            ;UPDATE TEST NUMBER
        011350  022712  000117                  CMP     #117,(R2)       ;SEQUENCE ERROR?
        011354  001011                          BNE     TST120-10       ;BR TO ERROR HALT ON SEQ ERROR
2083    011356  005000                          CLR     R0              ;R0=0
2084    011360  005100                          COM     R0              ;R0=177777
2085    011362  005004                          CLR     R4              ;R4=0
2086    011364  005014                          CLR     (R4)            ;LOC 0=0
2087    011366  005214                          INC     (R4)            ;LOC 0=1
2088    011370  061400                          ADD     (R4),R0         ;TRY ADD SOURCE MODE 1
2089    011372  001406                          BEQ     TST120
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 770           <====
        011374  012762  000222  177776          MOV     #222,-2(R2)     ;MOVE TO MAILBOX #  *******  222  *******
        011402  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        011406  000000                          HALT                    ;RESULT OF ADD INCORRECT
                                                                        ;  OR SEQUENCE ERROR
2090
2091                                    ;*****************************************************************************
2092                                    ;
2093                                    ;       THIS TEST VERIFIES MODE 1 DOP BYTE INSTRUCTIONS WHICH ADDRESS
2094                                    ;EVEN BYTES.  LOC. 0 IS SET TO -1 AND R4 IS CLEARED.  THEN R4 IS
2095                                    ;SET TO -1 USING A BISB THRU R0 WITH MODE 1.
2096                                    ;
```

```
2097                                    .SBTTL  TEST # 120 - TEST MODE 1 - EVEN BYTE W/ DOP INSTS.
                                        ;*****************************************************************************
                                        ;TEST 120 - TEST MODE 1 - EVEN BYTE W/ DOP INSTS.
                                        ;*****************************************************************************
     011410  005212                     TST120: INC     (R2)            ;UPDATE TEST NUMBER
     011412  022712  000120                     CMP     #120,(R2)       ;SEQUENCE ERROR?
     011416  001011                             BNE     TST121-10       ;BR TO ERROR HALT ON SEQ ERROR
2098 011420  005000                             CLR     R0              ;R0=0
2099 011422  005010                             CLR     (R0)            ;LOC. 0=0
2100 011424  005110                             COM     (R0)            ;LOC. 0=177777
2101 011426  005004                             CLR     R4              ;R4=0
2102 011430  151004                             BISB    (R0),R4         ;TRY MODE 1- EVEN BYTE W/ DOP
2103 011432  105104                             COMB    R4              ;R4=0
2104 011434  001406                             BEQ     TST121
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 770           <====
     011436  012762  000223  177776             MOV     #223,-2(R2)     ;MOVE TO MAILBOX #  *******  223  *******
     011444  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     011450  000000                             HALT                    ;RESULT OF BISB IS INCORRECT
                                                                        ;  OR SEQUENCE ERROR
2105
2106                                    ;*****************************************************************************
2107                                    ;
2108                                    ;       THIS TEST VERIFIES MODE 1 DOP NON-MODIFYING INSTRUCTIONS
2109                                    ;WHICH ADDRESS EVEN BYTES.  LOC. 0 IS SET TO -1 AND R0 IS CLEARED
2110                                    ;AND USED AS THE ADDRESSING REGISTER.  R4 IS SET TO 377 AND A
2111                                    ;MODE 1,0 CMPB INSTRUCTION IS USED THE RESULTS VERIFIED.
2112                                    ;
```

```
2113                                    .SBTTL  TEST # 121 - TEST MODE 1 - EVEN BYTE W/ DOP NON-MOD INST
                                        ;*****************************************************************************
                                        ;TEST 121 - TEST MODE 1 - EVEN BYTE W/ DOP NON-MOD INST
                                        ;*****************************************************************************
011452  005212                          TST121: INC     (R2)            ;UPDATE TEST NUMBER
011454  022712  000121                          CMP     #121,(R2)       ;SEQUENCE ERROR?
011460  001011                          BNE     TST122-10       ;BR TO ERROR HALT ON SEQ ERROR
2114 011462  005000                     CLR     R0              ;R0=0
2115 011464  005010                     CLR     (R0)            ;LOC 0=0
2116 011466  005110                     COM     (R0)            ;LOC 0=177777
2117 011470  005004                     CLR     R4              ;R4=0
2118 011472  105104                     COMB    R4              ;R4=377
2119 011474  121004                     CMPB    (R0),R4         ;TRY MODE 1 - EVEN BYTE W/ DOP NON-MODIFYING
2120 011476  001406                     BEQ     TST122
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 770           <====
011500  012762  000224  177776          MOV     #224,-2(R2)     ;MOVE TO MAILBOX #  *******  224  *******
011506  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
011512  000000                          HALT                    ;RESULT OF CMPB INCORRECT
                                                                ;  OR SEQUENCE ERROR
2121
2122                                    ;*****************************************************************************
2123                                    ;
2124                                    ;       THIS TEST VERIFIES MODE 1,0 MOVB INSTRUCTIONS
2125                                    ;WHICH ADDRESS EVEN BYTES.  LOC. 0 IS SET TO 177400, R0 IS CLEARED AND
2126                                    ;R4 IS SET TO -1.  MOVB ARE USED TO MOVE BYTE 0 TO R4.  THIS
2127                                    ;VERIFIES THAT THE PROPER BYTE WAS SELECTED AND THAT THE SIGN-X-TEND
2128                                    ;FUNCTION WITH MODE 0.
2129                                    ;       THEN LOC. 0 IS COMPLEMENTED AND THE SAME PROCEDURE EXERCISES
2130                                    ;THE LOGIC FOR COMPLEMENTARY DATA.
2131                                    ;       THIS TEST EXERCISES UNIQUE MICROCODE.
2132                                    ;
```

```
2133                                    .SBTTL  TEST # 122 - TEST MOV INSTRUCTION MODE 1,0 EVEN BYTE
                                        ;*************************************************************************
                                        ;TEST 122 - TEST MOV INSTRUCTION MODE 1,0 EVEN BYTE
                                        ;*************************************************************************
011514  005212                        TST122: INC     (R2)            ;UPDATE TEST NUMBER
011516  022712  000122                        CMP     #122,(R2)       ;SEQUENCE ERROR?
011522  001024                                BNE     TST123-10       ;BR TO ERROR HALT ON SEQ ERROR
2134 011524  005000                         CLR     R0              ;R0=0
2135 011526  005010                         CLR     (R0)            ;LOC 0=0
2136 011530  105110                         COMB    (R0)            ;LOC 0=177400
2137 011532  005110                         COM     (R0)
2138 011534  005004                         CLR     R4              ;R4=0
2139 011536  005104                         COM     R4              ;R4=177777
2140 011540  111004                         MOVB    (R0),R4         ;R4=0
2141 011542  005704                         TST     R4              ;CHECK SIGN OF WORD
2142 011544  001406                         BEQ     DOP1
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 766           <====
011546  012762  000225  177776                MOV     #225,-2(R2)     ;MOVE TO MAILBOX #  *******  225  *******
011554  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
011560  000000                                HALT                    ;MOVB SHOULD SIGN X-TEND
2143 011562  005110                 DOP1:   COM     (R0)            ;LOC 0=177777
2144 011564  111004                         MOVB    (R0),R4         ;DO MOVB W/ EVEN BYTE
2145 011566  100406                         BMI     TST123
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 755           <====
011570  012762  000226  177776                MOV     #226,-2(R2)     ;MOVE TO MAILBOX #  *******  226  *******
011576  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
011602  000000                                HALT                    ;MOVB SHOULD SIGN X-TEND
                                                                    ;  OR SEQUENCE ERROR
2146
2147                                    ;*************************************************************************
2148                                    ;
2149                                    ;       THIS TEST VERIFIES MODE 1 DOP INSTRUCTIONS WHICH REFERENCE
2150                                    ;ODD BYTES.  LOC. 0 IS SET TO 177400.  R0 IS SET TO 0 AND R4 IS
2151                                    ;SET TO 1.  THE BISB INSTRUCTION USES THE DATA IN BYTE 1 TO SET BYTE 0.
2152                                    ;THE RESULT IS CHECKED BY INCREMENTING THE WORD (LOC. 0) TO ZERO.
2153                                    ;
```

```
2154                                    .SBTTL  TEST # 123 - TEST MODE 1-ODD BYTE W/ DOP INSTS.
                                        ;*****************************************************************************
                                        ;TEST 123 - TEST MODE 1-ODD BYTE W/ DOP INSTS.
                                        ;*****************************************************************************
011604  005212                        TST123: INC     (R2)            ;UPDATE TEST NUMBER
011606  022712  000123                        CMP     #123,(R2)       ;SEQUENCE ERROR?
011612  001012                                BNE     TST124-10       ;BR TO ERROR HALT ON SEQ ERROR
2155 011614  005000                             CLR     R0              ;R0=0
2156 011616  005010                             CLR     (R0)            ;LOC. 0=0
2157 011620  005004                             CLR     R4              ;R4=0
2158 011622  005204                             INC     R4              ;R4=1
2159 011624  105114                             COMB    (R4)            ;LOC. 0=177400
2160 011626  151410                             BISB    (R4),(R0)       ;TRY TO BIS LOW ORDER BITS W/ MODE 1
2161 011630  005210                             INC     (R0)            ;CHECK RESULT
2162 011632  001406                             BEQ     TST124
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 767           <====
011634  012762  000227  177776                 MOV     #227,-2(R2)     ;MOVE TO MAILBOX #  *******  227  *******
011642  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
011646  000000                                 HALT                    ;RESULT OF BISB INCORRECT
                                                                        ;  OR SEQUENCE ERROR
2163
2164                                    ;*****************************************************************************
2165                                    ;
2166                                    ;       THIS TEST VERIFIES MODE 2 DOP INSTRUCTIONS.  LOC. 0 IS SET TO -1.
2167                                    ;R0 IS CLEARED AND USED AS THE MODE 2 ADDRESSING REGISTER TO MOVE LOC. 0
2168                                    ;TO R7.  THE DATA RESULTS ARE VERIFIED AND THE INCREMENTING OF THE REGISTER
2169                                    ;IS CHECKED.
2170                                    ;
```

```
2171                                    .SBTTL  TEST # 124 - TEST MODE 2 W/ DOP INSTS.
                                        ;*************************************************************************
                                        ;TEST 124 - TEST MODE 2 W/ DOP INSTS.
                                        ;*************************************************************************
     011650  005212                     TST124: INC     (R2)            ;UPDATE TEST NUMBER
     011652  022712  000124                     CMP     #124,(R2)       ;SEQUENCE ERROR?
     011656  001021                             BNE     TST125-10       ;BR TO ERROR HALT ON SEQ ERROR
2172 011660  005000                             CLR     R0              ;R0=0
2173 011662  005010                             CLR     (R0)            ;LOC. 0=0
2174 011664  005110                             COM     (R0)            ;LOC. 0=177777
2175 011666  012004                             MOV     (R0)+,R4        ;TRY MOVE MODE 2,0
2176 011670  005204                             INC     R4              ;CHECK R4
2177 011672  001406                             BEQ     DOP2
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 771           <====
     011674  012762  000230  177776             MOV     #230,-2(R2)     ;MOVE TO MAILBOX #  *******  230  *******
     011702  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     011706  000000                             HALT                    ;RESULT OF MOV INST INCORRECT
2178 011710  005300                     DOP2:   DEC     R0              ;TEST R0 AFTER MODE 2
2179 011712  005300                             DEC     R0
2180 011714  001406                             BEQ     TST125
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 760           <====
     011716  012762  000231  177776             MOV     #231,-2(R2)     ;MOVE TO MAILBOX #  *******  231  *******
     011724  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     011730  000000                             HALT                    ;REGISTER NOT INCREMENTED IN MODE 2
                                                                        ;  OR SEQUENCE ERROR
2181
2182                                    ;*************************************************************************
2183                                    ;
2184                                    ;       THIS TEST VERIFIES MODE 2 DOP BYTE INSTRUCTIONS WHICH ADDRESS
2185                                    ;EVEN BYTES.  LOC. 0 IS SET TO -1.  R0 IS CLEARED AND USED AS THE
2186                                    ;ADDRESSING REGISTER IN A TEST WHICH TRIES TO CLEAR BYTE 1 USING
2187                                    ;BYTE 0 DATA AND A BICB.  UNIQUE IN THIS TEST IS USE OF THE
2188                                    ;SAME ADDRESSING REGISTER FOR BOTH SOURCE AND DESTINATION.  THE SOURCE AND
2189                                    ;DESTINATION IS CHECKED TO INSURE PROPER FUNCTIONING.
2190                                    ;
```

```
2191                                    .SBTTL  TEST # 125 - TEST MODE 2 - EVEN BYTE W/ DOP INST.
                                        ;*****************************************************************************
                                        ;TEST 125 - TEST MODE 2 - EVEN BYTE W/ DOP INST.
                                        ;*****************************************************************************
011732  005212                        TST125: INC     (R2)            ;UPDATE TEST NUMBER
011734  022712  000125                        CMP     #125,(R2)       ;SEQUENCE ERROR?
011740  001022                                BNE     TST126-10       ;BR TO ERROR HALT ON SEQ ERROR
2192 011742  005000                         CLR     R0              ;R0=0
2193 011744  010010                         MOV     R0,(R0)         ;LOC. 0=0
2194 011746  005110                         COM     (R0)            ;LOC. 0=177777
2195 011750  142010                         BICB    (R0)+,(R0)      ;TRY TO CLEAR BYTE 1 FROM BYTE 0 W/ BICB
2196 011752  105737  000001                 TSTB    @#1             ;CHECK RESULT
2197 011756  001406                         BEQ     DOPB2A
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 770           <====
011760  012762  000232  177776                MOV     #232,-2(R2)     ;MOVE TO MAILBOX #  *******  232  *******
011766  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
011772  000000                                HALT                    ;BICB DESTINATION INCORRECT
2198 011774  105137  000000         DOPB2A: COMB    @#0             ;CHECK BICB SOURCE
2199 012000  001406                         BEQ     TST126
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 757           <====
012002  012762  000233  177776                MOV     #233,-2(R2)     ;MOVE TO MAILBOX #  *******  233  *******
012010  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
012014  000000                                HALT                    ;BICB SOURCE INCORRECTLY CHANGED
                                                                    ;  OR SEQUENCE ERROR
2200                                    ;*****************************************************************************
2201                                    ;
2202                                    ;       THIS TEST VERIFIES MODE 2 DOP BYTE INSTRUCTIONS WHICH REFERENCE
2203                                    ;ODD BYTES.  R0 IS SET TO 1, LOC. 0 IS SET TO 177400, AND R4 IS CLEARED.
2204                                    ;A MODE 2 MOVB USES R0 TO MOVE BYTE 1 TO R4.  AN INCREMENT
2205                                    ;IS USED TO CHECK THAT THE PROPER BYTE WAS MOVED AND SIGN X-TENDED.
2206                                    ;
```

```
2207                                    .SBTTL  TEST # 126 - TEST MODE 2 - ODD BYTE W/ DOP INST.
                                        ;*****************************************************************************
                                        ;TEST 126 - TEST MODE 2 - ODD BYTE W/ DOP INST.
                                        ;*****************************************************************************
     012016  005212                     TST126: INC     (R2)            ;UPDATE TEST NUMBER
     012020  022712  000126                     CMP     #126,(R2)       ;SEQUENCE ERROR?
     012024  001023                             BNE     TST127-10       ;BR TO ERROR HALT ON SEQ ERROR
2208 012026  005000                             CLR     R0              ;R0=0
2209 012030  005004                             CLR     R4              ;R4=0
2210 012032  005010                             CLR     (R0)            ;LOC. 0=0
2211 012034  005110                             COM     (R0)            ;LOC. 0=177777
2212 012036  105120                             COMB    (R0)+           ;LOC 0=177400; R0=1
2213 012040  112004                             MOVB    (R0)+,R4        ;TRY DOP MODE 2 W/ ODD BYTE
2214 012042  005204                             INC     R4              ;CHECK RESULT OF MOVB
2215 012044  001406                             BEQ     DOPB2B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 767           <====
     012046  012762  000234  177776             MOV     #234,-2(R2)     ;MOVE TO MAILBOX #  *******  234  *******
     012054  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     012060  000000                             HALT                    ;RESULT OF MOVB INCORRECT
2216 012062  005740                     DOPB2B: TST     -(R0)           ;BUMP R0 DOWN BY 2
2217 012064  005700                             TST     R0              ;CHECK R0
2218 012066  001406                             BEQ     TST127
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 756           <====
     012070  012762  000235  177776             MOV     #235,-2(R2)     ;MOVE TO MAILBOX #  *******  235  *******
     012076  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     012102  000000                             HALT                    ;MODE 2 BYTE DID NOT INCREMENT REG. CORRECTLY
                                                                        ;  OR SEQUENCE ERROR
2219                                    ;*****************************************************************************
2220                                    ;
2221                                    ;       THIS TEST VERIFIES MODE 3 DOUBLE-OPERAND INSTRUCTIONS.
2222                                    ;LOC. 0 IS LOADED WITH ALTERNATING ZEROES AND ONES; AND R0 IS LOADED
2223                                    ;WITH ALTERNATING ONES AND ZEROES.  A MODE 3 BIS IS USED TO SET R0
2224                                    ;TO -1 BY USING LOC. 0 AS THE SOURCE TO BIS THE ZEROES IN R0.  THE
2225                                    ;RESULT IS TESTED BY INCREMENTING R0 AND CHECKING FOR ZERO.
2226                                    ;
```

TEST # 127 - TEST MODE 3 W/ DOP INSTS.

```
 2227                                   .SBTTL  TEST # 127 - TEST MODE 3 W/ DOP INSTS.
                                        ;*****************************************************************************
                                        ;TEST 127 - TEST MODE 3 W/ DOP INSTS.
                                        ;*****************************************************************************
      012104  005212                    TST127: INC     (R2)            ;UPDATE TEST NUMBER
      012106  022712  000127                    CMP     #127,(R2)       ;SEQUENCE ERROR?
      012112  001013                            BNE     TST130-10       ;BR TO ERROR HALT ON SEQ ERROR
 2228 012114  012737  052525  000000           MOV     #052525,@#0     ;MOVE 52525 TO LOC. 0
 2229 012122  012700  125252                    MOV     #125252,R0      ;SET ALT. ONE AND ZERO IN R0
 2230 012126  053700  000000                    BIS     @#0,R0          ;TRY TO SET ALL OTHER BITS W/ MODE 3
 2231 012132  005200                            INC     R0              ;TEST RESULT
 2232 012134  001406                            BEQ     TST130
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 766           <====
      012136  012762  000236  177776            MOV     #236,-2(R2)     ;MOVE TO MAILBOX #  *******  236  *******
      012144  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      012150  000000                            HALT                    ;BIS W/ MODE 3 INCORRECT RESULT
                                                ;  OR SEQUENCE ERROR
                                        ;*****************************************************************************
 2233                                   ;
 2234                                   ;
 2235                                   ;       THIS TEST VERIFIES MODE 3 DOUBLE OPERAND BYTE INSTRUCTIONS WHICH
 2236                                   ;ADDRESS EVEN BYTES.  BYTE 0 IS SET TO ALTERNATING 1'S AND 0'S; BYTE 1,
 2237                                   ;ALTERNATING 0'S AND 1'S.  R0 IS CLEARED AND A BISB IS USED TO
 2238                                   ;SET THE LOW BYTE OF R0 TO 252.
 2239                                   ;
```

TEST # 130 - TEST MODE 3 - EVEN BYTE W/ DOP INSTS.

```
2240                                    .SBTTL  TEST # 130 - TEST MODE 3 - EVEN BYTE W/ DOP INSTS.
                                        ;*****************************************************************************
                                        ;TEST 130 - TEST MODE 3 - EVEN BYTE W/ DOP INSTS.
                                        ;*****************************************************************************
012152  005212                  TST130: INC     (R2)            ;UPDATE TEST NUMBER
012154  022712  000130                  CMP     #130,(R2)       ;SEQUENCE ERROR?
012160  001013                          BNE     TST131-10       ;BR TO ERROR HALT ON SEQ ERROR
2241 012162  012737  052652  000000     MOV     #52652,@#0      ;MOVE 1'S AND 0' PATTERN TO LOC. 0
2242 012170  005000                     CLR     R0              ;R0=0
2243 012172  153700  000000             BISB    @#0,R0          ;TRY R0=252 W/ MODE 3 - EVEN BYTE
2244 012176  022700  000252             CMP     #252,R0         ;BISB W/ EVEN BYTE SUCCESSFUL?
2245 012202  001406                     BEQ     TST131
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 766           <====
012204  012762  000237  177776          MOV     #237,-2(R2)     ;MOVE TO MAILBOX #  *******  237  *******
012212  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
012216  000000                          HALT                    ;BISB W/ MODE 3 - EVEN BYTE FAILED
                                                                ;  OR SEQUENCE ERROR
2246                                    ;*****************************************************************************
2247                                    ;
2248                                    ;       THIS TEST VERIFIES MODE 3 DOUBLE OPERAND BYTE INSTRUCTIONS
2249                                    ;WHICH ADDRESS ODD BYTES.  THE SAME PROCEDURE USED IN PREVIOUS
2250                                    ;TEST IS USED HERE.  THIS TIME BYTE 1 IS USED AS THE SOURCE BYTE.
2251                                    ;THE EXPECTED RESULT IS:  R0 = 125.
2252                                    ;
```

```
2253                                    .SBTTL  TEST # 131 - TEST MODE 3 - ODD BYTE W/ DOP INSTS.
                                        ;*****************************************************************************
                                        ;TEST 131 - TEST MODE 3 - ODD BYTE W/ DOP INSTS.
                                        ;*****************************************************************************
     012220  005212                     TST131: INC     (R2)            ;UPDATE TEST NUMBER
     012222  022712  000131                     CMP     #131,(R2)       ;SEQUENCE ERROR?
     012226  001013                             BNE     TST132-10       ;BR TO ERROR HALT ON SEQ ERROR
2254 012230  012737  052652  000000             MOV     #52652,@#0      ;MOVE 1'S AND 0'S PATTERN TO LOC 0
2255 012236  005000                             CLR     R0              ;R0=0
2256 012240  153700  000001                     BISB    @#1,R0          ;TRY R0=152 W/ MODE 3 - ODD BYTE
2257 012244  022700  000125                     CMP     #125,R0         ;R0=125?
2258 012250  001406                             BEQ     TST132
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 766           <====
     012252  012762  000240  177776             MOV     #240,-2(R2)     ;MOVE TO MAILBOX #  *******  240  *******
     012260  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     012264  000000                             HALT                    ;BISB W/ MODE 3 - ODD BYTE FAILED
                                                                        ;  OR SEQUENCE ERROR
2259
```

```
2260                                    .SBTTL  TEST # 132 - TEST DEST. MODE 0-BYTE W/ DOP NON-MODIFYING MST
                                        ;*****************************************************************************
                                        ;TEST 132 - TEST DEST. MODE 0-BYTE W/ DOP NON-MODIFYING MST
                                        ;*****************************************************************************
     012266  005212                     TST132: INC     (R2)            ;UPDATE TEST NUMBER
     012270  022712  000132                     CMP     #132,(R2)       ;SEQUENCE ERROR?
     012274  001023                             BNE     TST133-10       ;BR TO ERROR HALT ON SEQ ERROR
2261 012276  005000                             CLR     R0              ;R0=0
2262 012300  105100                             COMB    R0              ;R0=377
2263 012302  000263                             +SEC!SEV                ;SET C AND V BITS
2264 012304  132700  000200                     BITB    #200,R0         ;TRY DOPNM DEST. MODE 0-BYTE
2265 012310  001403                             BEQ     DNMB0A          ;BR TO ERROR IF Z BIT SET
2266 012312  102402                             BVS     DNMB0A          ;BR TO ERROR IF V BIT SET
2267 012314  103001                             BCC     DNMB0A          ;BR TO ERROR IF C BIT CLEAR.
2268 012316  100406                             BMI     DNMB0B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 766           <====
     012320                             DNMB0A:
     012320  012762  000241  177776             MOV     #241,-2(R2)     ;MOVE TO MAILBOX #  *******  241  *******
     012326  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     012332  000000                             HALT                    ;CC'S INCORRECT
2269 012334  105100                     DNMB0B: COMB    R0              ;CHECK DESTINATION DATA
2270 012336  001406                             BEQ     TST133
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 756           <====
     012340  012762  000242  177776             MOV     #242,-2(R2)     ;MOVE TO MAILBOX #  *******  242  *******
     012346  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     012352  000000                             HALT                    ;DEST. DATA MODIFIED
                                                                        ;  OR SEQUENCE ERROR
2271
```

```
2272                                    .SBTTL  TEST # 133 - TEST DEST. MODE 1 W/ DOP NON-MODIFYING INST
                                        ;*****************************************************************************
                                        ;TEST 133 - TEST DEST. MODE 1 W/ DOP NON-MODIFYING INST
                                        ;*****************************************************************************
012354  005212                        TST133: INC     (R2)            ;UPDATE TEST NUMBER
012356  022712  000133                        CMP     #133,(R2)       ;SEQUENCE ERROR?
012362  001023                                BNE     TST134-10       ;BR TO ERROR HALT ON SEQ ERROR
2273 012364  005000                         CLR     R0              ;R0=0
2274 012366  005010                         CLR     (R0)            ;LOC. 0=0
2275 012370  000241                         CLC                     ;CLEAR C BIT
2276 012372  032710  177777                BIT     #177777,(R0)    ;TRY DOPNM DEST. MODE 1
2277 012376  100403                         BMI     DNM1A           ;BR TO ERROR IF N BIT SET
2278 012400  102402                         BVS     DNM1A           ;BR TO ERROR IF V BIT SET
2279 012402  103401                         BCS     DNM1A           ;BR TO ERROR IF C BIT SET
2280 012404  001406                         BEQ     DNM1B
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 766           <====
012406                                  DNM1A:
012406  012762  000243  177776                MOV     #243,-2(R2)     ;MOVE TO MAILBOX #  *******  243  *******
012414  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
012420  000000                                HALT                    ;COND. CODES INCORRECT
2281 012422  005710                         DNM1B:  TST     (R0)            ;CHECK TEST DATA
2282 012424  001406                         BEQ     TST134
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 756           <====
012426  012762  000244  177776                MOV     #244,-2(R2)     ;MOVE TO MAILBOX #  *******  244  *******
012434  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
012440  000000                                HALT                    ;DESTINATION DATA MODIFIED
                                                                    ;  OR SEQUENCE ERROR
2283
```

TEST # 134 - TEST DEST, MODE 2 W/ DOP NON-MODIFYING INST.

```
2284                                    .SBTTL  TEST # 134 - TEST DEST, MODE 2 W/ DOP NON-MODIFYING INST.
                                        ;*************************************************************************
                                        ;TEST 134 - TEST DEST, MODE 2 W/ DOP NON-MODIFYING INST.
                                        ;*************************************************************************
012442  005212                        TST134: INC     (R2)            ;UPDATE TEST NUMBER
012444  022712  000134                        CMP     #134,(R2)       ;SEQUENCE ERROR?
012450  001035                                BNE     TST135-10       ;BR TO ERROR HALT ON SEQ ERROR
2285 012452  005000                           CLR     R0              ;R0=0
2286 012454  005010                           CLR     (R0)            ;LOC. 0=0
2287 012456  052710  125252                   BIS     #125252,(R0)    ;LOC. 0=125252
2288 012462  032720  077777                   BIT     #77777,(R0)+    ;TRY DOPNM INST W/ MODE 2
2289 012466  102402                           BVS     DNM2A           ;BR TO ERROR IF V BIT SET
2290 012470  001401                           BEQ     DNM2A           ;BR TO ERROR IF Z-BIT SET
2291 012472  100006                           BPL     DNM2B
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 766           <====
012474                                  DNM2A:
012474  012762  000245  177776                MOV     #245,-2(R2)     ;MOVE TO MAILBOX #  *******  245  *******
012502  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
012506  000000                                HALT                    ;COND. CODES INCORRECT
2292 012510  005300                    DNM2B:  DEC     R0              ;DECREMENT R0 TO CHECK IT.
2293 012512  005300                            DEC     R0
2294 012514  001406                            BEQ     DNM2D
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 755           <====
012516                                  DNM2C:
012516  012762  000246  177776                MOV     #246,-2(R2)     ;MOVE TO MAILBOX #  *******  246  *******
012524  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
012530  000000                                HALT                    ;MODE 2 REGISTER NOT INCREMENTED BY 2
2295 012532  022710  125252            DNM2D:  CMP     #125252,(R0)    ;CHECK DEST. DATA
2296 012536  001406                            BEQ     TST135
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 744           <====
012540  012762  000247  177776                MOV     #247,-2(R2)     ;MOVE TO MAILBOX #  *******  247  *******
012546  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
012552  000000                                HALT                    ;DEST. DATA MODIFIED
                                                                       ;  OR SEQUENCE ERROR
2297
```

```
2298                                    .SBTTL  TEST # 135 - TEST DEST. MODE 2-BYTE, W/DOP NON-MODIFYING INST
                                        ;*****************************************************************************
                                        ;TEST 135 - TEST DEST. MODE 2-BYTE, W/DOP NON-MODIFYING INST
                                        ;*****************************************************************************
012554  005212                  TST135: INC     (R2)            ;UPDATE TEST NUMBER
012556  022712  000135                  CMP     #135,(R2)       ;SEQUENCE ERROR?
012562  001063                          BNE     TST136-10       ;BR TO ERROR HALT ON SEQ ERROR
2299 012564  005000                     CLR     R0              ;R0=0
2300 012566  005010                     CLR     (R0)            ;LOC. 0=0
2301 012570  052710  052652             BIS     #52652,(R0)     ;LOC. 0=52652
2302 012574  000263                     *SEC!SEV                ;SET C AND V BITS
2303 012576  132720  000201             BITB    #201,(R0)+      ;TRY DOPNM INST. W/ MODE 2 EVEN BYTE
2304 012602  001403                     BEQ     DNMB2A          ;BR TO ERROR IF Z-BIT SET
2305 012604  103002                     BCC     DNMB2A          ;BR TO ERROR IF C-BIT CLEAR
2306 012606  102401                     BVS     DNMB2A          ;BR TO ERROR IF V-BIT SET
2307 012610  100406                     BMI     DNMB2B
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 764           <====
012612                          DNMB2A:
012612  012762  000250  177776          MOV     #250,-2(R2)     ;MOVE TO MAILBOX #  *******  250  *******
012620  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
012624  000000                          HALT                    ;COND. CODES INCORRECT
2308 012626  005300             DNMB2B: DEC     R0              ;CHECK DEST. REGISTER.
2309 012630  001406                     BEQ     DNMB2C
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 754           <====
012632  012762  000251  177776          MOV     #251,-2(R2)     ;MOVE TO MAILBOX #  *******  251  *******
012640  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
012644  000000                          HALT                    ;DEST. REGISTER NOT INCREMENTED BY 1
2310 012646  005200             DNMB2C: INC     R0              ;R0=1
2311 012650  132720  000201             BITB    #201,(R0)+      ;TRY DOPNM INST. W/MODE 2-ODD BYTE
2312 012654  001402                     BEQ     DNMB2D  ;BR TO ERROR IF Z-BIT SET
2313 012656  102401                     BVS     DNMB2D          ;BR TO ERROR IF V-BIT SET
2314 012660  100006                     BPL     DNMB2E
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 740           <====
012662                          DNMB2D:
012662  012762  000252  177776          MOV     #252,-2(R2)     ;MOVE TO MAILBOX #  *******  252  *******
012670  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
012674  000000                          HALT                    ;COND. CODES INCORRECT
2315 012676  005300             DNMB2E: DEC     R0              ;DEC R0 TO CHECK IT.
2316 012700  005300                     DEC     R0
2317 012702  001406                     BEQ     DNMB2F
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 727           <====
012704  012762  000253  177776          MOV     #253,-2(R2)     ;MOVE TO MAILBOX #  *******  253  *******
012712  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
012716  000000                          HALT                    ;DEST. REGISTER NOT INCREMENTED BY 1
2318 012720  022710  052652             CMP     #52652,(R0)     ;CHECK DEST. DATA IS UNMODIFIED
```

```
CKKAABO 11/44 CPU/EIS   MACRO M1113  06-APR-81 14:04  PAGE 106-1                                    SEQUENCE  122
TEST # 135 - TEST DEST. MODE 2-BYTE, W/DOP NON-MODIFYING INST

 2319 012724  001406                          BEQ     TST136
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 716           <====
      012726  012762  000254  177776          MOV     #254,-2(R2)   ;MOVE TO MAILBOX #  *******  254  *******
      012734  005262  177774                  INC     -4(R2)        ;SET MSGTYP TO FATAL ERROR
      012740  000000                          HALT                  ;DEST. DATA WAS MODIFIED.
                                                                    ;  OR SEQUENCE ERROR
 2320
 2321
```

```
 2322                                   .SBTTL  TEST # 136 - TEST DEST. MODE 3-BYTES W/DOP NON-MODIFYING INST.
                                        ;*****************************************************************************
                                        ;TEST 136 - TEST DEST. MODE 3-BYTES W/DOP NON-MODIFYING INST.
                                        ;*****************************************************************************
                                        ;
      012742  005212                    TST136: INC     (R2)            ;UPDATE TEST NUMBER
      012744  022712  000136                    CMP     #136,(R2)       ;SEQUENCE ERROR?
      012750  001060                            BNE     TST137-10       ;BR TO ERROR HALT ON SEQ ERROR
 2323 012752  005000                            CLR     R0              ;R0=0
 2324 012754  005010                            CLR     (R0)            ;LOC. 0=0
 2325 012756  052710  125125                    BIS     #125125,(R0)    ;LOC. 0=125125
 2326 012762  105100                            COMB    R0              ;R0=377
 2327 012764  005200                            INC     R0              ;R0=400
 2328 012766  005010                            CLR     (R0)            ;LOC. 400=0
 2329 012770  000263                            .SEC!SEV                ;C-BIT=V-BIT=1
 2330 012772  132730  000201                    BITB    #201,@(R0)+     ;TRY DOPNM W/MODE 3-EVEN BYTE
 2331 012776  001403                            BEQ     DNMB3A          ;BR TO ERROR IF Z BIT SET
 2332 013000  102402                            BVS     DNMB3A          ;BR TO ERROR IF V BIT SET
 2333 013002  103001                            BCC     DNMB3A          ;BR TO ERROR IF C BIT CLEAR
 2334 013004  100006                            BPL     DNMB3B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 761           <====
      013006                            DNMB3A:
      013006  012762  000255  177776            MOV     #255,-2(R2)     ;MOVE TO MAILBOX #  *******  255  *******
      013014  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      013020  000000                            HALT                    ;COND. CODES INCORRECT
 2335 013022  022700  000402            DNMB3B: CMP     #402,R0         ;CHECK DEST. REGISTER INC. BY 2 AND INC BY 2 AGAIN
 2336 013026  001406                            BEQ     DNMB3C
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 750           <====
      013030  012762  000256  177776            MOV     #256,-2(R2)     ;MOVE TO MAILBOX #  *******  256  *******
      013036  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      013042  000000                            HALT                    ;DEST. REGISTER NOT INCREMENTED BY 2
 2337 013044  005200                    DNMB3C: INC     R0              ;R0=404
 2338 013046  005200                            INC     R0
 2339 013050  132730  000201                    BITB    #201,@(R0)+     ;TRY DOPNM DEST MODE 3-BYTE(ODD)
 2340 013054  001402                            BEQ     DNMB3D          ;BR TO ERROR IF Z BIT SET
 2341 013056  102401                            BVS     DNMB3D          ;BR TO ERROR IF V BIT SET
 2342 013060  100406                            BMI     DNMB3E
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 733           <====
      013062                            DNMB3D:
      013062  012762  000257  177776            MOV     #257,-2(R2)     ;MOVE TO MAILBOX #  *******  257  *******
      013070  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      013074  000000                            HALT                    ;COND. CODES INCORRECT
 2343 013076  005004                    DNMB3E: CLR     R4              ;R4=0
 2344 013100  022714  125125                    CMP     #125125,(R4)    ;CHECK DEST. DATA
 2345 013104  001406                            BEQ     TST137
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 721           <====
```

TEST # 136 - TEST DEST. MODE 3-BYTES W/DOP NON-MODIFYING INST.

```
013106  012762  000260  177776          MOV     #260,-2(R2)     ;MOVE TO MAILBOX #  *******  260  *******
013114  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
013120  000000                          HALT                    ;DEST. DATA MODIFIED
                                                                ;  OR SEQUENCE ERROR
```

2346

```
 2347                                   .SBTTL  TEST # 137 - TEST DEST. MODE 4 W/DOP NON-MODIFYING INST.
                                        ;*****************************************************************************
                                        ;TEST 137 - TEST DEST. MODE 4 W/DOP NON-MODIFYING INST.
                                        ;*****************************************************************************
      013122  005212                   TST137: INC     (R2)            ;UPDATE TEST NUMBER
      013124  022712  000137                   CMP     #137,(R2)       ;SEQUENCE ERROR?
      013130  001041                           BNE     TST140-10       ;BR TO ERROR HALT ON SEQ ERROR
 2348 013132  005000                           CLR     R0              ;R0=0
 2349 013134  005010                           CLR     (R0)            ;LOC. 0=0
 2350 013136  052710  125252               BIS     #125252,(R0)    ;LOC. 0=125125
 2351 013142  052700  000002               BIS     #2,R0           ;R0=2
 2352 013146  000277                       SCC                     ;SET ALL COND. CODE BITS
 2353 013150  032740  020000               BIT     #20000,-(R0)    ;TRY DOPNM W/ MODE 4
 2354 013154  100403                       BMI     DNM4A           ;BR TO ERROR IF N-BIT SET
 2355 013156  102402                       BVS     DNM4A           ;BR TO ERROR IF V-BIT SET
 2356 013160  103001                       BCC     DNM4A           ;BR TO ERROR IF C-BIT CHAR
 2357 013162  001006                       BNE     DNM4B
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                   ;           CONDITIONAL BRANCH INST. AND   <====
                                                                   ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                   ;           WHICH FOLLOWS W/ 762           <====
      013164                           DNM4A:
      013164  012762  000261  177776           MOV     #261,-2(R2)     ;MOVE TO MAILBOX #  *******  261  *******
      013172  005262  177774                   INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      013176  000000                           HALT                    ;CONT. CODES INCORRECT
 2358 013200  005700                   DNM4B:  TST     R0              ;CHECK DEST. REGISTER
 2359 013202  001406                           BEQ     DNM4C
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                   ;           CONDITIONAL BRANCH INST. AND   <====
                                                                   ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                   ;           WHICH FOLLOWS W/ 752           <====
      013204  012762  000262  177776           MOV     #262,-2(R2)     ;MOVE TO MAILBOX #  *******  262  *******
      013212  005262  177774                   INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      013216  000000                           HALT                    ;DEST. REGISTER NOT DECREMENTED BY 2
 2360 013220  022737  125252  000000   DNM4C:  CMP     #125252,@#0     ;CHECK DEST. DATA
 2361 013226  001406                           BEQ     TST140
                                                                   ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                   ;           CONDITIONAL BRANCH INST. AND   <====
                                                                   ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                   ;           WHICH FOLLOWS W/ 740           <====
      013230  012762  000263  177776           MOV     #263,-2(R2)     ;MOVE TO MAILBOX #  *******  263  *******
      013236  005262  177774                   INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      013242  000000                           HALT                    ;DEST. DATA MODIFIED
                                                                       ;  OR SEQUENCE ERROR
 2362
```

```
 2363                                   .SBTTL  TEST # 140 - TEST DEST. MODE 4-BYTE W/ DOP NON-MODIFYING INST.
                                        ;*****************************************************************************
                                        ;TEST 140 - TEST DEST. MODE 4-BYTE W/ DOP NON-MODIFYING INST.
                                        ;*****************************************************************************
                                        ;
      013244  005212                    TST140: INC     (R2)            ;UPDATE TEST NUMBER
      013246  022712  000140                    CMP     #140,(R2)       ;SEQUENCE ERROR?
      013252  001063                            BNE     TST141-10       ;BR TO ERROR HALT ON SEQ ERROR
 2364 013254  005000                            CLR     R0              ;R0=0
 2365 013256  005010                            CLR     (R0)            ;LOC. 0=0
 2366 013260  052710  052652                    BIS     #52652,(R0)     ;LOC. 0=52652
 2367 013264  052700  000002                    BIS     #2,R0           ;R0=2
 2368 013270  000257                            CCC                     ;COND. CODES=0
 2369 013272  132740  000201                    BITB    #201,-(R0)      ;TRY DOPNM INST W/MODE 4 ODD BYTE
 2370 013276  102403                            BVS     DNMB4A          ;BR TO ERROR IF V BIT SET
 2371 013300  001402                            BEQ     DNMB4A  ;BR TO ERROR IF Z BIT SET
 2372 013302  103401                            BCS     DNMB4A          ;BR TO ERROR IF C BIT SET
 2373 013304  001006                            BNE     DNMB4B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 762           <====
      013306                            DNMB4A:
      013306  012762  000264  177776            MOV     #264,-2(R2)     ;MOVE TO MAILBOX #  *******  264  *******
      013314  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      013320  000000                            HALT                    ;COND. CODES INCORRECT
 2374 013322  022700  000001            DNMB4B: CMP     #1,R0           ;CHECK DEST. REGISTER
 2375 013326  001406                            BEQ     DNMB4C
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 751           <====
      013330  012762  000265  177776            MOV     #265,-2(R2)     ;MOVE TO MAILBOX #  *******  265  *******
      013336  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      013342  000000                            HALT                    ;DEST REG. NOT DECREMENTED BY 1
 2376 013344  132740  000201            DNMB4C: BITB    #201,-(R0)      ;TRY DOPNM INST. W/MODE 4 EVEN BYTE
 2377 013350  001401                            BEQ     DNMB4D          ;BR TO ERROR IF Z-BIT SET
 2378 013352  100406                            BMI     DNMB4E
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 737           <====
      013354                            DNMB4D:
      013354  012762  000266  177776            MOV     #266,-2(R2)     ;MOVE TO MAILBOX #  *******  266  *******
      013362  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      013366  000000                            HALT                    ;COND. CODES INCORRECT
 2379 013370  005700                    DNMB4E: TST     R0              ;CHECK DEST. REGISTER
 2380 013372  001406                            BEQ     DNMB4F
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 727           <====
      013374  012762  000267  177776            MOV     #267,-2(R2)     ;MOVE TO MAILBOX #  *******  267  *******
      013402  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      013406  000000                            HALT                    ;DEST. REG. NOT DECREMENTED BY 1
 2381 013410  022710  052652            DNMB4F: CMP     #52652,(R0)     ;CHECK DESTINATION DATA
 2382 013414  001406                            BEQ     TST141
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
```

```
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 716           <====
013416  012762  000270  177776          MOV     #270,-2(R2)     ;MOVE TO MAILBOX #  *******  270  *******
013424  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
013430  000000                          HALT                    ;DEST. DATA MODIFIED
                                                                ;  OR SEQUENCE ERROR

2383
```

TEST # 141 - TEST DEST MODE 5 W/DOP NON-MODIFYING INST.

```
2384                                    .SBTTL  TEST # 141 - TEST DEST MODE 5 W/DOP NON-MODIFYING INST.
                                        ;*****************************************************************************
                                        ;TEST 141 - TEST DEST MODE 5 W/DOP NON-MODIFYING INST.
                                        ;*****************************************************************************
 013432  005212                         TST141: INC     (R2)            ;UPDATE TEST NUMBER
 013434  022712  000141                         CMP     #141,(R2)       ;SEQUENCE ERROR?
 013440  001042                                BNE     TST142-10       ;BR TO ERROR HALT ON SEQ ERROR
2385 013442  005000                             CLR     R0              ;R0=0
2386 013444  005010                             CLR     (R0)            ;LOC 0=0
2387 013446  052710  100000                     BIS     #100000,(R0)    ;LOC. 0=100000
2388 013452  052700  000402                     BIS     #402,R0         ;R0=2
2389 013456  000277                             SCC                     ;SET ALL COND. CODE BITS
2390 013460  032750  100000                     BIT     #100000,@-(R0)  ;TRY DOPNM W/MODE 5
2391 013464  102403                             BVS     DNM5A           ;BR TO ERROR IF V-BIT SET
2392 013466  103002                             BCC     DNM5A           ;BR TO ERROR IF C-BIT CLEAR
2393 013470  001401                             BEQ     DNM5A           ;BR TO ERROR IF Z-BIT SET
2394 013472  100406                             BMI     DNM5B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 762           <====
 013474                                 DNM5A:
 013474  012762  000271  177776                 MOV     #271,-2(R2)     ;MOVE TO MAILBOX #  *******  271  *******
 013502  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 013506  000000                                 HALT                    ;COND, CODES INCORRECT
2395 013510  022700  000400             DNM5B: CMP #400,R0              ;CHECK DEST. REGISTER
2396 013514  001406                             BEQ     DNM5C
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 751           <====
 013516  012762  000272  177776                 MOV     #272,-2(R2)     ;MOVE TO MAILBOX #  *******  272  *******
 013524  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 013530  000000                                 HALT                    ;DEST. REGISTER NOT DECREMENTED BY 2
2397 013532  022737  100000  000000  DNM5C:     CMP     #100000,@#0     ;CHECK DESTINATION DATA
2398 013540  001406                             BEQ     TST142
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 737           <====
 013542  012762  000273  177776                 MOV     #273,-2(R2)     ;MOVE TO MAILBOX #  *******  273  *******
 013550  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 013554  000000                                 HALT                    ;DEST. DATA INCORRECTLY MODIFIED
                                                                        ;  OR SEQUENCE ERROR
2399
```

```
2400                                    .SBTTL  TEST # 142 - TEST DEST. MODE 6 W/DOP NON-MODIFYING INST.
                                        ;*************************************************************************
                                        ;TEST 142 - TEST DEST. MODE 6 W/DOP NON-MODIFYING INST.
                                        ;*************************************************************************
013556  005212                  TST142: INC     (R2)            ;UPDATE TEST NUMBER
013560  022712  000142                  CMP     #142,(R2)       ;SEQUENCE ERROR?
013564  001041                          BNE     TST143-10       ;BR TO ERROR HALT ON SEQ ERROR
2401 013566  005000                     CLR     R0              ;R0=0
2402 013570  005010                     CLR     (R0)            ;LOC> 0=0
2403 013572  052710  000001             BIS     #1,(R0)         ;LOC. 0=1
2404 013576  005100                     COM     R0              ;R0=-1 C-BIT=1
2405 013600  032760  000001  000001     BIT     #1,1(R0)        ;TRY DOPNM W/MODE 6
2406 013606  001403                     BEQ     DNM6A           ;BR TO ERROR IF Z-BIT SET
2407 013610  102402                     BVS     DNM6A           ;BR TO ERROR IF V-BIT SET
2408 013612  103001                     BCC     DNM6A           ;BR TO ERROR IF C-BIT CLEAR
2409 013614  100006                     BPL     DNM6B
                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                        ;           WHICH FOLLOWS W/ 763           <====
013616                          DNM6A:
013616  012762  000274  177776         MOV     #274,-2(R2)     ;MOVE TO MAILBOX #  *******  274  *******
013624  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
013630  000000                         HALT                    ;COND CODES INCORRECT
2410 013632  022700  177777     DNM6B:  CMP     #-1,R0          ;CHECK DEST. REGISTER
2411 013636  001406                     BEQ     DNM6C
                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                        ;           WHICH FOLLOWS W/ 752           <====
013640  012762  000275  177776         MOV     #275,-2(R2)     ;MOVE TO MAILBOX #  *******  275  *******
013646  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
013652  000000                         HALT                    ;DEST. REGISTER MODIFIED
2412 013654  022737  000001  000000 DNM6C:  CMP     #1,@#0          ;CHECK DEST. DATA
2413 013662  001406                     BEQ     TST143
                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                        ;           WHICH FOLLOWS W/ 740           <====
013664  012762  000276  177776         MOV     #276,-2(R2)     ;MOVE TO MAILBOX #  *******  276  *******
013672  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
013676  000000                         HALT                    ;DEST. DATA MODIFIED
                                        ;  OR SEQUENCE ERROR
2414
```

```
2415                                    .SBTTL  TEST # 143 - TEST DEST MODE 7 W/DOP NON-MODIFYING INST.
                                        ;*****************************************************************************
                                        ;TEST 143 - TEST DEST MODE 7 W/DOP NON-MODIFYING INST.
                                        ;*****************************************************************************
 013700  005212                       TST143: INC     (R2)            ;UPDATE TEST NUMBER
 013702  022712  000143                       CMP     #143,(R2)       ;SEQUENCE ERROR?
 013706  001042                             BNE     TST144-10       ;BR TO ERROR HALT ON SEQ ERROR
2416 013710  005000                         CLR     R0              ;R0=0
2417 013712  005010                         CLR     (R0)            ;LOC. 0=0 C-BIT=0
2418 013714  052710  125125                 BIS     #125125,(R0)    ;LOC. 0=125125
2419 013720  052700  000001                 BIS     #1,R0           ;R0=1
2420 013724  132770  000125  000403         BITB    #125,@403(R0)   ;TRY DOPNM W/MODE 7
2421 013732  102403                         BVS     DNM7A           ;BR TO ERROR IF V-BIT SET
2422 013734  100402                         BMI     DNM7A           ;BR TO ERROR IF N-BIT SET
2423 013736  103401                         BCS     DNM7A           ;BR TO ERROR IF C-BIT SET
2424 013740  001406                         BEQ     DNM7B
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                     ;           CONDITIONAL BRANCH INST. AND   <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                     ;           WHICH FOLLOWS W/ 762           <====
 013742                                 DNM7A:
 013742  012762  000277  177776             MOV     #277,-2(R2)     ;MOVE TO MAILBOX #  *******  277  *******
 013750  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 013754  000000                             HALT                    ;COND. CODES INCORRECT
2425 013756  022700  000001         DNM7B:  CMP     #1,R0           ;CHECK DEST. REGISTER
2426 013762  001406                         BEQ     DNM7C
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                     ;           CONDITIONAL BRANCH INST. AND   <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                     ;           WHICH FOLLOWS W/ 751           <====
 013764  012762  000300  177776             MOV     #300,-2(R2)     ;MOVE TO MAILBOX #  *******  300  *******
 013772  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 013776  000000                             HALT                    ;DESTINATION REGISTER MODIFIED
2427 014000  022737  125125  000000 DNM7C:  CMP     #125125,@#0     ;CHECK DEST. DATA
2428 014006  001406                         BEQ     TST144
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                     ;           CONDITIONAL BRANCH INST. AND   <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                     ;           WHICH FOLLOWS W/ 737           <====
 014010  012762  000301  177776             MOV     #301,-2(R2)     ;MOVE TO MAILBOX #  *******  301  *******
 014016  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 014022  000000                             HALT                    ;DEST. DATA INCORRECT
                                                                     ;  OR SEQUENCE ERROR
2429
2430                                    ;*****************************************************************************
2431                                    ;
2432                                    ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 1 INSTRUCTION.
2433                                    ;DATA IS SET IN R0 USING SOP INSTRUCTIONS AND THEN MOVED TO LOC. 0
2434                                    ;USING MOV SRC MODE 0, DEST. MODE 1.
2435                                    ;
```

```
2436                                    .SBTTL  TEST # 144 - TEST MOV DESTINATION MODE 1
                                        ;*****************************************************************************
                                        ;TEST 144 - TEST MOV DESTINATION MODE 1
                                        ;*****************************************************************************
     014024  005212                     TST144: INC     (R2)            ;UPDATE TEST NUMBER
     014026  022712  000144                     CMP     #144,(R2)       ;SEQUENCE ERROR?
     014032  001022                             BNE     TST145-10       ;BR TO ERROR HALT ON SEQ ERROR
2437 014034  005000                             CLR     R0              ;R0=0
2438 014036  005010                             CLR     (R0)            ;LOC. 0=0
2439 014040  005100                             COM     R0              ;R0=-1
2440 014042  005004                             CLR     R4              ;R4 POINTS TO LOC. 0
2441 014044  010014                             MOV     R0,(R4)         ;TRY MOVE MODE 0,1
2442 014046  102402                             BVS     MDM1A           ;BR TO ERROR IF V SET
2443 014050  001401                             BEQ     MDM1A           ;BR TO ERROR IF Z SET
2444 014052  100406                             BMI     MDM1B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 767           <====
     014054                             MDM1A:
     014054  012762  000302  177776             MOV     #302,-2(R2)     ;MOVE TO MAILBOX #  *******  302  *******
     014062  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     014066  000000                             HALT                    ;CONDITION CODE NOT CORRECT
2445 014070  005704                     MDM1B:  TST     R4
2446 014072  001406                             BEQ     TST145
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 757           <====
     014074  012762  000303  177776             MOV     #303,-2(R2)     ;MOVE TO MAILBOX #  *******  303  *******
     014102  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     014106  000000                             HALT                    ;DESTINATION REGISTER INCORRECTLY ALTERED
                                                                        ;  OR SEQUENCE ERROR
2447
2448                                    ;*****************************************************************************
2449                                    ;
2450                                    ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 2 INSTRUCTION.
2451                                    ;       DATA IS SET IN R0 USING SOP INSTRUCTIONS AND THEN MOVED
2452                                    ;       TO LOCATION 0 USING MOV SRC MODE 0, DEST. MODE 1.
2453                                    ;
```

```
2454                                    .SBTTL  TEST # 145 - TEST MOV DESTINATION MODE 2
                                        ;*****************************************************************************
                                        ;TEST 145 - TEST MOV DESTINATION MODE 2
                                        ;*****************************************************************************
     014110  005212                     TST145: INC     (R2)            ;UPDATE TEST NUMBER
     014112  022712  000145                     CMP     #145,(R2)       ;SEQUENCE ERROR?
     014116  001033                             BNE     TST146-10       ;BR TO ERROR HALT ON SEQ ERROR
2455 014120  005000                             CLR     R0              ;R0=0
2456 014122  005010                             CLR     (R0)            ;LOC.0=0
2457 014124  005110                             COM     (R0)            ;LOC. 0= 1
2458 014126  010020                             MOV     R0,(R0)+        ;TRY MOVE MODE 0,2
2459 014130  100402                             BMI     MDM2A           ;BR TO ERROR IF N SET
2460 014132  102401                             BVS     MDM2A           ;BR TO ERROR IF V SET
2461 014134  001406                             BEQ     MDM2B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 770           <====
     014136                             MDM2A:
     014136  012762  000304  177776             MOV     #304,-2(R2)     ;MOVE TO MAILBOX #  *******  304  *******
     014144  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     014150  000000                             HALT                    ;CC'S INCORRECT
2462 014152  005300                     MDM2B:  DEC     R0
2463 014154  005300                             DEC     R0
2464 014156  001406                             BEQ     MDM2D
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 757           <====
     014160                             MDM2C:
     014160  012762  000305  177776             MOV     #305,-2(R2)     ;MOVE TO MAILBOX #  *******  305  *******
     014166  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     014172  000000                             HALT                    ;DESTINATION REGISTER NOT INCREMENTED PROPERLY
2465 014174  005737  000000             MDM2D:  TST     @#0
2466 014200  001406                             BEQ     TST146
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 746           <====
     014202  012762  000306  177776             MOV     #306,-2(R2)     ;MOVE TO MAILBOX #  *******  306  *******
     014210  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     014214  000000                             HALT                    ;DESTINATION DATA INCORRECT
                                                                        ;  OR SEQUENCE ERROR
2467
2468                                    ;*****************************************************************************
2469                                    ;
2470                                    ;       THIS TEST VERIFIES DESTINATION MODE 2 W/MOVB INSTS. TWO DIFFERENT MOVB
2471                                    ;INSTRUCTIONS ARE USED TO MOVE A TEST PATTERN FIRST TO BYTE 0 THEN TO BYTE 1.
2472                                    ;
```

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2473                                    .SBTTL  TEST # 146 - TEST MOV-BYTE DESTINATION MODE 2
                                        ;*****************************************************************************
                                        ;TEST 146 - TEST MOV-BYTE DESTINATION MODE 2
                                        ;*****************************************************************************
 014216  005212                         TST146: INC     (R2)            ;UPDATE TEST NUMBER
 014220  022712  000146                         CMP     #146,(R2)       ;SEQUENCE ERROR?
 014224  001060                                 BNE     TST147-10       ;BR TO ERROR HALT ON SEQ ERROR
2474 014226  005000                             CLR     R0              ;R0=0
2475 014230  005010                             CLR     (R0)            ;LOC. 0=0
2476 014232  112720  000125                     MOVB    #125,(R0)+      ;TRY DESTINATION MODE 2 W/EVEN BYTE
2477 014236  102402                             BVS     MBDM2A          ;BR TO ERROR IF V SET
2478 014240  001401                             BEQ     MBDM2A          ;BR TO ERROR IF Z SET
2479 014242  100006                             BPL     MBDM2B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 770           <====
 014244                                 MBDM2A:
 014244  012762  000307  177776                 MOV     #307,-2(R2)     ;MOVE TO MAILBOX #  *******  307  *******
 014252  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 014256  000000                                 HALT                    ;CC'S INCORRECT
2480 014260  022700  000001             MBDM2B: CMP     #1,R0
2481 014264  001406                             BEQ     MBDM2C
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 757           <====
 014266  012762  000310  177776                 MOV     #310,-2(R2)     ;MOVE TO MAILBOX #  *******  310  *******
 014274  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 014300  000000                                 HALT                    ;REGISTER NOT INCREMENTED BY ONE
2482 014302  112720  000252             MBDM2C: MOVB    #252,(R0)+      ;TRY DESTINATION MODE 2 W/ODD BYTE
2483 014306  102402                             BVS     MBDM2D
2484 014310  001401                             BEQ     MBDM2D
2485 014312  100406                             BMI     MBDM2E
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 744           <====
 014314                                 MBDM2D:
 014314  012762  000311  177776                 MOV     #311,-2(R2)     ;MOVE TO MAILBOX #  *******  311  *******
 014322  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 014326  000000                                 HALT                    ;CC'S NOT SET CORRECT
2486 014330  022700  000002             MBDM2E: CMP     #2,R0
2487 014334  001406                             BEQ     MBDM2F
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 733           <====
 014336  012762  000312  177776                 MOV     #312,-2(R2)     ;MOVE TO MAILBOX #  *******  312  *******
 014344  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 014350  000000                                 HALT                    ;REGISTER NOT INCREMENTED BY ONE
2488 014352  022737  125125  000000     MBDM2F: CMP     #125125,@#0     ;CHECK DATA
2489 014360  001406                             BEQ     TST147
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 721           <====
```

```
014362  012762  000313  177776          MOV     #313,-2(R2)     ;MOVE TO MAILBOX #  *******  313  *******
014370  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
014374  000000                          HALT                    ;DESTINATION DATA INCORRECT
                                                                ;  OR SEQUENCE ERROR

2490
2491                    ;*************************************************************************************
2492                    ;
2493                    ;       THIS TEST VERIFIES MOV DESTINATION MODE 3. R0 IS USED TO PICK UP
2494                    ;AN ADDRESS AT LOC. 400. LOC 400 POINTS TO LOC. 0 THE FFFECTIVE DEST. ADDR.. ALSO, MOVB
2495                    ;INST. ARE USED W/ EVEN AND ODD BYTES TO CHECK MOV BYTES INST AND MODE 37 DESTINATIONS.
```

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                                .SBTTL  TEST # 147 - TEST MOV(B) DESTINATION MODE 3
                                ;*************************************************************************
                                ;TEST 147 - TEST MOV(B) DESTINATION MODE 3
                                ;*************************************************************************
                                ;
014376  005212                  TST147: INC     (R2)            ;UPDATE TEST NUMBER
014400  022712  000147                  CMP     #147,(R2)       ;SEQUENCE ERROR?
014404  001071                          BNE     TST150-10       ;BR TO ERROR HALT ON SEQ ERROR
2497 014406  012700  000400             MOV     #400,R0         ;R0=400
2498 014412  005010                      CLR     (R0)            ;LOC. 400 POINTS TO LOC. 0
2499 014414  005037  000000             CLR     @#0             ;LOC. 0=0
2500 014420  012730  125252             MOV     #125252,@(R0)+  ;TRY MOV DESTINATION MODE 2
2501 014424  102402                      BVS     MDM3A           ;BR TO ERROR IF V SET
2502 014426  001401                      BEQ     MDM3A           ;BR TO ERROR IF Z SET
2503 014430  100406                      BMI     MDM3B
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                 ;           CONDITIONAL BRANCH INST. AND   <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                 ;           WHICH FOLLOWS W/ 765           <====
014432                          MDM3A:
014432  012762  000314  177776          MOV     #314,-2(R2)     ;MOVE TO MAILBOX #  *******  314  *******
014440  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
014444  000000                          HALT                    ;CC'S INCORRECT
2504 014446  022700  000402     MDM3B:  CMP     #402,R0         ;CHECK DEST. MODE REGISTER
2505 014452  001406                      BEQ     MDM3C
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                 ;           CONDITIONAL BRANCH INST. AND   <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                 ;           WHICH FOLLOWS W/ 754           <====
014454  012762  000315  177776          MOV     #315,-2(R2)     ;MOVE TO MAILBOX #  *******  315  *******
014462  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
014466  000000                          HALT                    ;REGISTER NOT INCREMENTED BY 2
2506 014470  022737  125252  000000 MDM3C:  CMP     #125252,@#0     ;CHECK DESTINATION DATA
2507 014476  001406                      BEQ     MDM3D
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                 ;           CONDITIONAL BRANCH INST. AND   <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                 ;           WHICH FOLLOWS W/ 742           <====
014500  012762  000316  177776          MOV     #316,-2(R2)     ;MOVE TO MAILBOX #  *******  316  *******
014506  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
014512  000000                          HALT                    ;DESTINATION DATA INCORRECT
2508 014514  112737  000125  000000 MDM3D:  MOVB    #125,@#0        ;TRY MOVB DESTINATION MODE 2 EVEN BYTE
2509 014522  022737  125125  000000         CMP     #125125,@#0     ;CHECK DATA
2510 014530  001406                      BEQ     MDM3E
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                 ;           CONDITIONAL BRANCH INST. AND   <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                 ;           WHICH FOLLOWS W/ 725           <====
014532  012762  000317  177776          MOV     #317,-2(R2)     ;MOVE TO MAILBOX #  *******  317  *******
014540  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
014544  000000                          HALT                    ;DESTINATION DATA INCORRECT
2511 014546  112737  000525  000001 MDM3E:  MOVB    #525,@#1        ;TRY MOVB DESTINATION MODE 2 ODD BYTE
2512 014554  022737  052525  000000         CMP     #52525,@#0      ;CHECK DATA
2513 014562  001406                      BEQ     TST150
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                 ;           CONDITIONAL BRANCH INST. AND   <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                 ;           WHICH FOLLOWS W/ 710           <====
```

```
014564  012762  000320  177776          MOV     #320,-2(R2)     ;MOVE TO MAILBOX #  *******  320  *******
014572  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
014576  000000                          HALT                    ;
2514
2515                    ;*************************************************************************************
2516                    ;
2517                    ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 4 INSTRUCTION.
2518                    ;SOP INSTRUCTIONS ON R0 ARE USED TO CLEAR TARGET LOCATION 0.
2519                    ;R4 IS USED AS THE MODE 4 ADDRESSING REGISTER, AND
2520                    ;CONDITIONAL BRANCHES ARE USED TO VERIFY THE DATA.
2521                    ;
```

```
2522                                    .SBTTL  TEST # 150 - TEST MOV DESTINATION MODE 4
                                        ;*****************************************************************************
                                        ;TEST 150 - TEST MOV DESTINATION MODE 4
                                        ;*****************************************************************************
 014600  005212                         TST150: INC     (R2)            ;UPDATE TEST NUMBER
 014602  022712  000150                         CMP     #150,(R2)       ;SEQUENCE ERROR?
 014606  001034                               BNE     TST151-10       ;BR TO ERROR HALT ON SEQ ERROR
2523 014610  005000                           CLR     R0              ;R0=0
2524 014612  005010                           CLR     (R0)            ;LOC 0=0
2525 014614  012704  000002                   MOV     #2,R4           ;R4=2
2526 014620  012744  012345                   MOV     #12345,-(R4)    ;TRY MOV DEST. MODE 4
2527 014624  102402                           BVS     MDM4A           ;BR TO ERROR IF V-BIT SET
2528 014626  001401                           BEQ     MDM4A           ;BR TO ERROR IF Z-BIT SET
2529 014630  100006                           BPL     MDM4B
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                      ;           WHICH FOLLOWS W/ 766           <====
 014632                                 MDM4A:
 014632  012762  000321  177776                 MOV     #321,-2(R2)     ;MOVE TO MAILBOX #  *******  321  *******
 014640  005262  177774                       INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 014644  000000                               HALT                    ;CC'S NOT CORRECT
2530 014646  005704                    MDM4B: TST     R4              ;CHECK DECREMENTING OF MODE 4 REG.
2531 014650  001406                           BEQ     MDM4C
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                      ;           WHICH FOLLOWS W/ 756           <====
 014652  012762  000322  177776                 MOV     #322,-2(R2)     ;MOVE TO MAILBOX #  *******  322  *******
 014660  005262  177774                       INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 014664  000000                               HALT                    ;DESTINATION MODE REGISTER NOT DECREMENTED BY 2
2532 014666  022710  012345            MDM4C: CMP     #12345,(R0)     ;CHECK DESTINATION DATA
2533 014672  001406                           BEQ     TST151
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                      ;           WHICH FOLLOWS W/ 745           <====
 014674  012762  000323  177776                 MOV     #323,-2(R2)     ;MOVE TO MAILBOX #  *******  323  *******
 014702  005262  177774                       INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 014706  000000                               HALT                    ;DESTINATION DATA INCORRECT
                                                                      ;  OR SEQUENCE ERROR
2534
2535                                    ;*****************************************************************************
2536                                    ;
2537                                    ;       THIS TEST VERIFIES THE MOVB DESTINATION MODE 4 INSTRUCTION
2538                                    ;       ON BOTH ODD AND EVEN BYTES. SOP INSTRUCTIONS ON R4 ARE
2539                                    ;       USED TO CLEAR TARGET LOCATION 0. R0 IS USED AS THE MODE 4
2540                                    ;       ADDRESSING REGISTER, AND CMP AND CONDITIONAL BRANCH
2541                                    ;       INSTRUCTIONS ARE USED TO VERIFY THE DATA.
2542                                    ;
```

TEST # 151 - TEST MOVB DESTINATION MODE 4

```
                                        .SBTTL  TEST # 151 - TEST MOVB DESTINATION MODE 4
                                        ;*************************************************************************
                                        ;TEST 151 - TEST MOVB DESTINATION MODE 4
                                        ;*************************************************************************
 014710  005212                 TST151: INC     (R2)            ;UPDATE TEST NUMBER
 014712  022712  000151                 CMP     #151,(R2)       ;SEQUENCE ERROR?
 014716  001060                         BNE     TST152-10       ;BR TO ERROR HALT ON SEQ ERROR
2544 014720  005004                     CLR     R4              ;R4=0
2545 014722  005014                     CLR     (R4)            ;LOC. 0=0
2546 014724  012700  000002             MOV     #2,R0           ;R0 = 2
2547 014730  112740  125125             MOVB    #125125,-(R0)   ;TRY MOVB DEST. MODE 4-ODD BYTE
2548 014734  020027  000001             CMP     R0,#1           ;CHECK THAT DEST. REG. WAS DECREMENTED
2549 014740  001406                     BEQ     MBDM4A
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 766           <====
 014742  012762  000324  177776         MOV     #324,-2(R2)     ;MOVE TO MAILBOX #  *******  324  *******
 014750  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 014754  000000                         HALT                    ;DESTINATION REG. NOT DECREMENTED BY 1
2550 014756  021427  052400     MBDM4A: CMP     (R4),#52400     ;CHECK DEST. DATA
2551 014762  001406                     BEQ     MBDM4B
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 755           <====
 014764  012762  000325  177776         MOV     #325,-2(R2)     ;MOVE TO MAILBOX #  *******  325  *******
 014772  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 014776  000000                         HALT                    ;DEST. DATA NOT CORRECT
2552 015000  112740  125125     MBDM4B: MOVB    #125125,-(R0)   ;TRY MOVB DEST. MODE 4--EVEN BYTE
2553 015004  102402                     BVS     MBDM4C          ;BR. TO ERROR IF V-BIT SET
2554 015006  001401                     BEQ     MBDM4C          ;BR TO ERROR IF Z-BIT SET
2555 015010  100006                     BPL     MBDM4D
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 742           <====
 015012                         MBDM4C:
 015012  012762  000326  177776         MOV     #326,-2(R2)     ;MOVE TO MAILBOX #  *******  326  *******
 015020  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 015024  000000                         HALT                    ;COND. CODES INCORRECT
2556 015026  005700     MBDM4D: TST     R0                      ;CHECK MODE 4 DEST. REGISTER
2557 015030  001406                     BEQ     MBDM4E
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 732           <====
 015032  012762  000327  177776         MOV     #327,-2(R2)     ;MOVE TO MAILBOX #  *******  327  *******
 015040  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 015044  000000                         HALT                    ;DESTINATION REG NOT DECREMENTED BY 1
2558 015046  021427  052525     MBDM4E: CMP     (R4),#52525     ;CHECK DEST. DAT^A
2559 015052  001406                     BEQ     TST152
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 721           <====
 015054  012762  000330  177776         MOV     #330,-2(R2)     ;MOVE TO MAILBOX #  *******  330  *******
```

```
        015062  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        015066  000000                         HALT                    ;DESTINATION DATA INCORRECT
                                                                        ;  OR SEQUENCE ERROR

  2560
  2561                          ;*************************************************************************
  2562                          ;
  2563                          ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 5 AND THE MOVB
  2564                          ;DESTINATION MODE 5 - EVEN BYTE INSTRUCTIONS. R4 IS A
  2565                          ;POINTER TO TARGET LOCATION 0 AND R0 IS SETUP TO
  2566                          ;POINT TO LOCATION 376 FOR THE MOV, AND LOCATION 404 FOR
  2567                          ;THE MOVB INSTRUCTIONS. CMP INSTRUCTIONS ARE USED TO VERIFY
  2568                          ;PROPER ADDRESSING AND DATA.
  2569                          ;
```

```
2570                                    .SBTTL  TEST # 152 - TEST MOV DESTINATION MODE 5
                                        ;*****************************************************************************
                                        ;TEST 152 - TEST MOV DESTINATION MODE 5
                                        ;*****************************************************************************
                                        ;
      015070  005212                    TST152: INC     (R2)            ;UPDATE TEST NUMBER
      015072  022712  000152                    CMP     #152,(R2)       ;SEQUENCE ERROR?
      015076  001063                            BNE     TST153-10       ;BR TO ERROR HALT ON SEQ ERROR
2571  015100  005004                            CLR     R4              ;R4=0
2572  015102  005014                            CLR     (R4)            ;LOC. 0 = 0
2573  015104  012700  000400                    MOV     #400,R0         ;R0=400
2574  015110  012750  004321                    MOV     #4321,@-(R0)    ;TRY MOV DEST. MODE 5
2575  015114  102402                            BVS     MDM5A           ;BR TO ERROR IF V-BIT SET
2576  015116  001401                            BEQ     MDM5A           ;BR TO ERROR IF Z-BIT SET
2577  015120  100006                            BPL     MDM5B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 766           <====
      015122                            MDM5A:
      015122  012762  000331  177776            MOV     #331,-2(R2)     ;MOVE TO MAILBOX #  *******  331  *******
      015130  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      015134  000000                            HALT                    ;COND. CODES INCORRECT
2578  015136  022700  000376            MDM5B:  CMP     #376,R0         ;CHECK MODE 5 REG. WAS DECREMENTED
2579  015142  001406                            BEQ     MDM5C
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 755           <====
      015144  012762  000332  177776            MOV     #332,-2(R2)     ;MOVE TO MAILBOX #  *******  332  *******
      015152  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      015156  000000                            HALT                    ;MODE 5 REGISTER NOT DECREMENTED BY 2
2580  015160  022714  004321            MDM5C:  CMP     #4321,(R4)      ;CHECK DEST. DATA
2581  015164  001406                            BEQ     MDM5D
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 744           <====
      015166  012762  000333  177776            MOV     #333,-2(R2)     ;MOVE TO MAILBOX #  *******  333  *******
      015174  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      015200  000000                            HALT                    ;DEST. DATA INCORRECT
2582  015202  012700  000406            MDM5D:  MOV     #406,R0         ;R0=406
2583  015206  112750  000377                    MOVB    #377,@-(R0)     ;TRY MOV DEST. MODE 5 --EVEN BYTE
2584  015212  022700  000404                    CMP     #404,R0         ;CHECK MODE 5 REG.
2585  015216  001406                            BEQ     MDM5E
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 727           <====
      015220  012762  000334  177776            MOV     #334,-2(R2)     ;MOVE TO MAILBOX #  *******  334  *******
      015226  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      015232  000000                            HALT                    ;MODE 5 REGISTER NOT DECREMENTED BY 2
2586  015234  022714  177721            MDM5E:  CMP     #177721,(R4)    ;CHECK DEST. DATA
2587  015240  001406                            BEQ     TST153
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 716           <====
```

TEST # 152 - TEST MOV DESTINATION MODE 5

```
        015242  012762  000335  177776          MOV     #335,-2(R2)     ;MOVE TO MAILBOX #  *******  335  *******
        015250  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        015254  000000                          HALT                    ;DEST. DATA INCORRECT
                                                                        ;  OR SEQUENCE ERROR

   2588
   2589                         ;*************************************************************************************
   2590                         ;
   2591                         ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 6 AND MOVB - EVEN BYTE
   2592                         ;DESTINATION MODE 6 INDTRUCTIONS. R0 IS USED TO SETUP TARGET LOC.0
   2593                         ;FOR BOTH TESTS. PATTERNS OF ONES AND ZEROES ARE MOVED INTO LOC.0
   2594                         ;BY MODE 6 INSTRUCTIONS, AND CMP INSTRUCTIONS ARE USED TO VERIFY
   2595                         ;PROPER ADDRESSING AND DATA.
   2596                         ;
```

```
                                .SBTTL  TEST # 153 - TEST MOV DESTINATION MODE 6
                                ;*****************************************************************************
                                ;TEST 153 - TEST MOV DESTINATION MODE 6
                                ;*****************************************************************************
                                ;
                        TST153: INC     (R2)            ;UPDATE TEST NUMBER
                                CMP     #153,(R2)       ;SEQUENCE ERROR?
                                BNE     TST154-10       ;BR TO ERROR HALT ON SEQ ERROR
                                CLR     R0              ;R0=0
                                CLR     (R0)            ;LOC. 0=0
                                INC     R0              ;R0=1
                                MOV     #052525,-1(R0)  ;TRY MOV DEST. MODE 6
                                BVS     MDM6A           ;BR TO ERROR IF V-BIT SET
                                BEQ     MDM6A           ;BR TO ERROR IF Z-BIT SET
                                BPL     MDM6B
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 766           <====
                        MDM6A:
                                MOV     #336,-2(R2)     ;MOVE TO MAILBOX #  *******  336  *******
                                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
                                HALT                    ;COND. CODES INCORRECT
                        MDM6B:  CMP     #1,R0           ;CHECK DEST. REGISTER UNALTERED
                                BEQ     MDM6C
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 755           <====
                                MOV     #337,-2(R2)     ;MOVE TO MAILBOX #  *******  337  *******
                                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
                                HALT                    ;DEST. REGISTER INCORRECTLY ALTERED
                        MDM6C:  CMP     #52525,@#0      ;CHECK DEST. DATA
                                BEQ     MDM6D
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 743           <====
                                MOV     #340,-2(R2)     ;MOVE TO MAILBOX #  *******  340  *******
                                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
                                HALT                    ;DEST. DATA INCORRECT
                        MDM6D:  MOV     #2,R0           ;R0=2
                                MOVB    #377,-1(R0)     ;TRY MOVB DEST. MODE 6
                                CMP     #2,R0           ;CHECK DEST. REGISTER UNALTERED
                                BEQ     MDM6E
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 725           <====
                                MOV     #341,-2(R2)     ;MOVE TO MAILBOX #  *******  341  *******
                                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
                                HALT                    ;DEST. REGISTER INCORRECTLY ALTERED
                        MDM6E:  CMP     #177525,@#0     ;CHECK DEST. DATA
                                BEQ     TST154
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 713           <====
```

```
015436  012762  000342  177776          MOV     #342,-2(R2)     ;MOVE TO MAILBOX #  *******  342  *******
015444  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
015450  000000                          HALT                    ;DEST. DATA INCORRECT
                                                                ;  OR SEQUENCE ERROR

2615
2616                            ;*************************************************************************************
2617                            ;
2618                            ;       THIS TEST VERIFIES THE MOV DESTINATION MODE 7 AND MOVB - ODD BYTE
2619                            ;DESTINATION MODE 7 INSTRUCTIONS. R4 POINTS TO TARGET LOC.0 AND R0
2620                            ;IS USED AS THE MODE 7 ADDRESSING REGISTER. CMP INSTRUCTIONS ARE
2621                            ;USED TO VERIFY PROPER ADDRESSING AND DATA.
2622                            ;
```

```
                                .SBTTL  TEST # 154 - TEST MOV DESTINATION MODE 7
                                ;*****************************************************************************
                                ;TEST 154 - TEST MOV DESTINATION MODE 7
                                ;*****************************************************************************
 015452  005212                TST154: INC     (R2)            ;UPDATE TEST NUMBER
 015454  022712  000154                CMP     #154,(R2)       ;SEQUENCE ERROR?
 015460  001065                        BNE     TST155-10       ;BR TO ERROR HALT ON SEQ ERROR
2624 015462  005004                    CLR     R4              ;R4=0
2625 015464  005014                    CLR     (R4)            ;LOC.0=0
2626 015466  012700  000403            MOV     #403,R0         ;R0=403
2627 015472  012770  070707  177777    MOV     #70707,@-1(R0)  ;TRY MOV W/DEST MODE 7
2628 015500  102402                    BVS     MDM7A           ;BR. TO ERROR IF V-BIT SET
2629 015502  001401                    BEQ     MDM7A           ;BR TO ERROR IF Z-BIT SET
2630 015504  100006                    BPL     MDM7B
                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                        ;           WHICH FOLLOWS W/ 765           <====
 015506                         MDM7A:
 015506  012762  000343  177776        MOV     #343,-2(R2)     ;MOVE TO MAILBOX #  *******  343  *******
 015514  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 015520  000000                        HALT                    ;COND. CODES INCORRECT
2631 015522  022700  000403    MDM7B:  CMP     #403,R0         ;CHECK DEST. REGISTER
2632 015526  001406                    BEQ     MDM7C
                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                        ;           WHICH FOLLOWS W/ 754           <====
 015530  012762  000344  177776        MOV     #344,-2(R2)     ;MOVE TO MAILBOX #  *******  344  *******
 015536  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 015542  000000                        HALT                    ;DEST. REGISTER INCORRECTLY ALTERED
2633 015544  022737  070707  000000    CMP     #70707,@#0      ;CHECK DEST. DATA
2634 015552  001406                    BEQ     MDM7D
                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                        ;           WHICH FOLLOWS W/ 742           <====
 015554  012762  000345  177776        MOV     #345,-2(R2)     ;MOVE TO MAILBOX #  *******  345  *******
 015562  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 015566  000000                        HALT                    ;DEST. DATA INCORRECT
2635 015570  112770  107070  000001    MOVB    #107070,@1(R0)  ;TRY MOVB W/DEST MODE 7--ODD BYTE
2636 015576  022700  000403            CMP     #403,R0         ;CHECK MODE 7 DEST. REG.
2637 015602  001406                    BEQ     MDM7E
                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                        ;           WHICH FOLLOWS W/ 726           <====
 015604  012762  000346  177776        MOV     #346,-2(R2)     ;MOVE TO MAILBOX #  *******  346  *******
 015612  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 015616  000000                        HALT                    ;DEST. DATA INCORRECT
2638 015620  022737  034307  000000    CMP     #34307,@#0      ;CHECK DEST. DATA
2639 015626  001406                    BEQ     TST155
                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                        ;           WHICH FOLLOWS W/ 714           <====
 015630  012762  000347  177776        MOV     #347,-2(R2)     ;MOVE TO MAILBOX #  *******  347  *******
```

```
015636  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
015642  000000                         HALT                    ;DESTINATION DATA INCORRECT
                                                                ;  OR SEQUENCE ERROR

2640
2641                    ;*******************************************************************************
2642                    ;
2643                    ;       THIS TEST VERIFIES MODE 4 DOUBLE OPERAND INSTRUCTIONS.
2644                    ;THE TEST USES MODE 4 ADDRESSING WITH REGISTER 0 TO MOVE THRU A
2645                    ;TABLE OF OPERANDS.  THE TABLE OF OPERANDS AND THE WORK LOCATION IS
2646                    ;STORED FOLLOWING THE TEST CODE.  A SERIES OF 5 DOP INSTRUCTIONS UTILIZES
2647                    ;THE DATA IN THE TABLE TO CYCLE THE WORK LOCATION THRU A SET OF
2648                    ;VALUE.  THE DATA HAS BEEN CHOSEN TO INSURE THAT NO SINGLE ERROR WILL
2649                    ;GO UNDETECTED.  WORD AND BYTE INSTRUCTION ACCESSING BOTH EVEN AND
2650                    ;ODD ADDRESSES ARE USED IN THE TEST.  THE LISTING SHOWS THE
2651                    ;EXPECTED INTERMEDIATE RESULT AS EACH INSTRUCTION IS EXECUTED.
2652                    ;
```

```
                                        .SBTTL  TEST # 155 - TEST MODE 4 W/ DOP INSTS.
                                        ;*****************************************************************************
                                        ;TEST 155 - TEST MODE 4 W/ DOP INSTS.
                                        ;*****************************************************************************
015644  005212                          TST155: INC     (R2)                    ;UPDATE TEST NUMBER
015646  022712  000155                          CMP     #155,(R2)               ;SEQUENCE ERROR?
015652  001015                                  BNE     DOP4                    ;BR TO ERROR HALT ON SEQ ERROR
2654 015654  012700  015732                    MOV     #TBL1,R0                ;INITIALIZE R0
2655 015660  014037  015732                    MOV     -(R0),@#TBL1            ;TBL1=125252
2656 015664  064037  015732                    ADD     -(R0),@#TBL1            ;TBL1=000377
2657 015670  144037  015732                    BICB    -(R0),@#TBL1            ;TBL1=000252
2658 015674  154037  015733                    BISB    -(R0),@#TBL1+1          ;TBL1=125252
2659 015700  024037  015732                    CMP     -(R0),@#TBL1            ;CHECK RESULT
2660 015704  001413                           BEQ     TST156
                                                                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                               ;           CONDITIONAL BRANCH INST. AND   <====
                                                                               ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                               ;           WHICH FOLLOWS W/ 762           <====
015706                                  DOP4:
015706  012762  000350  177776                 MOV     #350,-2(R2)             ;MOVE TO MAILBOX #  *******  350  *******
015714  005262  177774                         INC     -4(R2)                  ;SET MSGTYP TO FATAL ERROR
015720  000000                                 HALT                            ;RESULT OF MODE 4 INSTS. INCORRECT
                                                                               ;  OR SEQUENCE ERROR
2661
2662 015722  125252                            125252
2663 015724  052652                            52652
2664 015726  053125                            53125
2665 015730  125252                            125252
2666 015732  000000                    TBL1:   0
2667
2668                                    ;*****************************************************************************
2669                                    ;
2670                                    ;       THIS TEST VERIFIES MODE 5 DOUBLE OPERAND INSTRUCTIONS.
2671                                    ;THE TEST USES AN ADDRESS TABLE STORED FOLLOWING THE TEST CODE.
2672                                    ;THIS TABLE IS SIMPLY A TABLE OF ADDRESS POINTERS WHICH ADDRESS
2673                                    ;THE DATA TABLE USED IN THE PREVIOUS TEST.  THE TEST IS IDENTICAL TO
2674                                    ;THE PREVIOUS TEST EXCEPT THE DATA IS REFERENCED USING THIS ADDRESS
2675                                    ;TABLE AND MODE 5 ADDRESSING.  (SEE PREVIOUS TEST).
2676                                    ;
```

```
2677                                    .SBTTL  TEST # 156 - TEST MODE 5 W/ DOP INSTS.
                                        ;*****************************************************************************
                                        ;TEST 156 -- TEST MODE 5 W/ DOP INSTS.
                                        ;*****************************************************************************
                                        TST156: INC     (R2)                ;UPDATE TEST NUMBER
        015734  005212                          CMP     #156,(R2)           ;SEQUENCE ERROR?
        015736  022712  000156                  BNE     DOP5                ;BR TO ERROR HALT ON SEQ ERROR
        015742  001015                  2678    MOV     #TBL2+2,R0          ;INITIALIZE R0
2678    015744  012700  016024          2679    MOV     @-(R0),@#TBL1       ;TBL1=125252
2679    015750  015037  015732          2680    ADD     @-(R0),@#TBL1       ;TBL1=000377
2680    015754  065037  015732          2681    BICB    @-(R0),@#TBL1       ;TBL1=000252
2681    015760  145037  015732          2682    BISB    @-(R0),@#TBL1+1     ;TBL1=125252
2682    015764  155037  015733          2683    CMP     @-(R0),@#TBL1       ;CHECK RESULT
2683    015770  025037  015732          2684    BEQ     TST157
2684    015774  001413
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                ;           CONDITIONAL BRANCH INST. AND    <====
                                                ;           REPLACE THE MOVE INSTRUCTION    <====
                                                ;           WHICH FOLLOWS W/ 762            <====
        015776                          DOP5:
        015776  012762  000351  177776          MOV     #351,-2(R2)         ;MOVE TO MAILBOX #  *******  351  *******
        016004  005262  177774                  INC     -4(R2)              ;SET MSGTYP TO FATAL ERROR
        016010  000000                          HALT                        ;RESULT OF MODE 5 INSTS. INCORRECT
                                                ;  OR SEQUENCE ERROR
2685    016012  015722                          TBL1-10
2686    016014  015724                          TBL1-6
2687    016016  015725                          TBL1-5
2688    016020  015726                          TBL1-4
2689    016022  015730                  TBL2:   TBL1-2
2690                                    ;*****************************************************************************
2691                                    ;
2692                                    ;       THIS TEST VERIFIES MODE 6 DOUBLE OPERAND INSTRUCTIONS.
2693                                    ;IT USES THE SAME DATA AS THAT USED IN THE MODE 4 TESTS.
2694                                    ;THIS TIME THE DATA IS ACCESSED USING MODE 6.  R0 IS SET
2695                                    ;TO POINT TO THE MIDDLE OF THE TABLE.  THE TABLE IS ACCESSED FROM
2696                                    ;BOTTOM TO TOP BY VARYING THE OFFSET IN THE MODE 6 INSTRUCTIONS.
2697                                    ;THE DATA RESULTS ARE IDENTICAL TO THOSE EXPECTED IN THE MODE 4
2698                                    ;TESTS.
2699                                    ;
```

```
2700                                    .SBTTL  TEST # 157 - TEST MODE 6 W/ DOP INSTS.
                                        ;*************************************************************************
                                        ;TEST 157 - TEST MODE 6 W/ DOP INSTS.
                                        ;*************************************************************************
     016024  005212                     TST157: INC     (R2)                ;UPDATE TEST NUMBER
     016026  022712  000157                     CMP     #157,(R2)           ;SEQUENCE ERROR?
     016032  001024                             BNE     TST160-10           ;BR TO ERROR HALT ON SEQ ERROR
2701 016034  012700  015726                     MOV     #TBL1-4,R0          ;INITIALIZE R0
2702 016040  016037  000002  015732             MOV     2(R0),@#TBL1        ;TBL1=125252
2703 016046  066037  000000  015732             ADD     0(R0),@#TBL1        ;TBL1=000377
2704 016054  146037  177777  015732             BICB    -1(R0),@#TBL1       ;TBL1=000252
2705 016062  156037  177776  015733             BISB    -2(R0),@#TBL1+1     ;TBL1=125252
2706 016070  026037  177774  015732             CMP     -4(R0),@#TBL1       ;CHECK RESULT
2707 016076  001406                             BEQ     TST160
                                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                            ;           CONDITIONAL BRANCH INST. AND    <====
                                                                            ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                            ;           WHICH FOLLOWS W/ 755            <====
     016100  012762  000352  177776             MOV     #352,-2(R2)         ;MOVE TO MAILBOX #  *******  352  *******
     016106  005262  177774                     INC     -4(R2)              ;SET MSGTYP TO FATAL ERROR
     016112  000000                             HALT                        ;RESULT OF MODE 6 INSTS. INCORRECT
                                                                            ;  OR SEQUENCE ERROR
2708                                    ;*************************************************************************
2709                                    ;
2710                                    ;       THIS TEST VERIFIES MODE 7 DOUBLE OPERAND INSTRUCTIONS.
2711                                    ;THIS TEST USES THE SAME ADDRESS TABLE AND DATA TABLE USED BY
2712                                    ;THE MODE 5 TESTS.  THIS TIME THE DATA IS ACCESSED USING MODE 7.
2713                                    ;R0 IS SET TO POINT TO THE MIDDLE OF THE ADDRESS TABLE IN THE MODE 5
2714                                    ;TEST.  THE TABLE IS ACCESSED FROM BOTTOM TO TOP BY VARYING THE OFFSET
2715                                    ;IN THE MODE 7 INSTRUCTIONS.  THE DATA RESULTS ARE IDENTICAL TO
2716                                    ;THOSE EXPECTED IN THE MODE 5 TESTS.
2717                                    ;
```

TEST # 160 - TEST MODE 7 W/ DOP INSTS.

```
2718                                    .SBTTL  TEST # 160 - TEST MODE 7 W/ DOP INSTS.
                                        ;*****************************************************************************
                                        ;TEST 160 - TEST MODE 7 W/ DOP INSTS.
                                        ;*****************************************************************************
                                        ;
        016114  005212                  TST160: INC     (R2)                    ;UPDATE TEST NUMBER
        016116  022712  000160                  CMP     #160,(R2)               ;SEQUENCE ERROR?
        016122  001024                          BNE     TST161-10               ;BR TO ERROR HALT ON SEQ ERROR
2719    016124  012700  016016                  MOV     #TBL2-4,R0              ;INITIALIZE R0
2720    016130  017037  000004  015732          MOV     @4(R0),@#TBL1           ;TBL1=125252
2721    016136  067037  000002  015732          ADD     @2(R0),@#TBL1           ;TBL1=000377
2722    016144  147037  000000  015732          BICB    @0(R0),@#TBL1           ;TBL1=000252
2723    016152  157037  177776  015733          BISB    @-2(R0),@#TBL1+1                ;TBL1=125252
2724    016160  027037  177774  015732          CMP     @-4(R0),@#TBL1          ;CHECK RESULT
2725    016166  001406                          BEQ     TST161
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 755           <====
        016170  012762  000353  177776          MOV     #353,-2(R2)             ;MOVE TO MAILBOX #  *******  353  *******
        016176  005262  177774                  INC     -4(R2)                  ;SET MSGTYP TO FATAL ERROR
        016202  000000                          HALT                            ;RESULT OF MODE 7 INSTS INCORRECT
                                                ;  OR SEQUENCE ERROR
2726                                    ;*****************************************************************************
2727                                    ;
2728                                    ;       THIS TEST VERIFIES THE ROTATE MODE 0 INSTRUCTIONS.
2729                                    ;R0 IS LOADED WITH A DATA PATTERN, THE C-BIT IS LOADED, AND
2730                                    ;AN ROL INSTRUCTION IS EXECUTED WITH MODE 0.  THE OPERATION IS CHECKED
2731                                    ;BY TESTING THE RESULTING DATA AND THE STATE OF THE C AND V BITS.
2732                                    ;NEXT, THE SAME PROCEDURE IS EXECUTED TO TEST MODE 0 BYTE INSTRUCTIONS.
2733                                    ;
```

```
2734                                    .SBTTL  TEST # 161 - TEST ROTATE INSTRUCTIONS OF MODE 0
                                        ;*****************************************************************************
                                        ;TEST 161 - TEST ROTATE INSTRUCTIONS OF MODE 0
                                        ;*****************************************************************************
     016204  005212                     TST161: INC     (R2)            ;UPDATE TEST NUMBER
     016206  022712  000161                     CMP     #161,(R2)       ;SEQUENCE ERROR?
     016212  001032                             BNE     TST162-10       ;BR TO ERROR HALT ON SEQ ERROR
2735 016214  012700  125252                     MOV     #125252,R0      ;INITIALIZE DATA
2736 016220  000261                             SEC                     ;SET C-BIT
2737 016222  006100                             ROL     R0              ;TRY ROL W/ MODE 0
2738 016224  102004                             BVC     ROT0A           ;CC=0011
2739 016226  103003                             BCC     ROT0A
2740 016230  022700  052525                     CMP     #052525,R0      ;CHECK DATA
2741 016234  001406                             BEQ     ROT0B
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 766           <====
     016236                             ROT0A:
     016236  012762  000354  177776             MOV     #354,-2(R2)     ;MOVE TO MAILBOX #  *******  354  *******
     016244  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     016250  000000                             HALT                    ;ROL MODE 0 FAILED
2742 016252  012700  125252             ROT0B: MOV     #125252,R0      ;INITIALIZE DATA
2743 016256  000261                             SEC                     ;SET C-BIT
2744 016260  106100                             ROLB    R0              ;TRY ROL W/ MODE 0 EVEN BYTE
2745 016262  102004                             BVC     ROT0C           ;CC=0011
2746 016264  103003                             BCC     ROT0C
2747 016266  022700  125125                     CMP     #125125,R0      ;CHECK DATA
2748 016272  001406                             BEQ     TST162
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 747           <====
     016274                             ROT0C:
     016274  012762  000355  177776             MOV     #355,-2(R2)     ;MOVE TO MAILBOX #  *******  355  *******
     016302  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     016306  000000                             HALT                    ;ROLB MODE 0 FAILED
                                                ;  OR SEQUENCE ERROR
2749
2750                                    ;*****************************************************************************
2751                                    ;
2752                                    ;       THIS TEST VERIFIES THE ROTATE MODE 1 INSTRUCTIONS.
2753                                    ;THE DATA TO BE ROTATED IS IN LOC 0.  R0 IS USED AS THE
2754                                    ;ADDRESSING REGISTER.  THE C-BIT IS LOADED AND AN ROL IS EXECUTED.
2755                                    ;THE RESULTS ARE CHECKED BY COMPARING THE DATA RESULTS AND TESTING
2756                                    ;THE C AND V BITS.  THIS PROCEDURE IS THEN REPEATED TWICE MORE
2757                                    ;TO TEST THE BYTE ROTATES.  FIRST ON BYTE 0, THEN ON BYTE 1.
2758                                    ;
```

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2759                                    .SBTTL  TEST # 162 - TEST ROTATE INSTRUCTIONS W/ MODE 1
                                        ;*****************************************************************************
                                        ;TEST 162 - TEST ROTATE INSTRUCTIONS W/ MODE 1
                                        ;*****************************************************************************
     016310  005212                     TST162: INC     (R2)            ;UPDATE TEST NUMBER
     016312  022712  000162                     CMP     #162,(R2)       ;SEQUENCE ERROR?
     016316  001057                             BNE     TST163-10       ;BR TO ERROR HALT ON SEQ ERROR
2760 016320  005000                             CLR     R0              ;POINT TO LOC. 0
2761 016322  012710  052525                     MOV     #52525,(R0)     ;INITIALIZE DATA
2762 016326  000241                             CLC                     ;CLEAR C-BIT
2763 016330  006110                             ROL     (R0)            ;TRY ROL W/ MODE 1
2764 016332  102005                             BVC     ROT1A           ;CC=1010
2765 016334  103404                             BCS     ROT1A
2766 016336  023727  000000  125252             CMP     @#0,#125252     ;CHECK RESULT
2767 016344  001406                             BEQ     ROT1B
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 764           <====
     016346                             ROT1A:
     016346  012762  000356  177776             MOV     #356,-2(R2)     ;MOVE TO MAILBOX #  *******  356  *******
     016354  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     016360  000000                             HALT                    ;ROL MODE 1 FAILED
2768 016362  000261                     ROT1B:  SEC
2769 016364  012710  125252                     MOV     #125252,(R0)    ;INITIALIZE DATA
2770 016370  106110                             ROLB    (R0)            ;TRY ROLB W/ MODE 1 EVEN BYTE
2771 016372  102005                             BVC     ROT1C           ;CC=1011
2772 016374  103004                             BCC     ROT1C
2773 016376  022737  125125  000000             CMP     #125125,@#0     ;TEST RESULT
2774 016404  001406                             BEQ     ROT1D
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 744           <====
     016406                             ROT1C:
     016406  012762  000357  177776             MOV     #357,-2(R2)     ;MOVE TO MAILBOX #  *******  357  *******
     016414  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     016420  000000                             HALT                    ;ROLB W/ MODE 1 EVEN BYTE FAILED
2775 016422  012710  125252             ROT1D:  MOV     #125252,(R0)
2776 016426  005000                             CLR     R0              ;POINT TO ODD BYTE
2777 016430  005200                             INC     R0
2778 016432  000261                             SEC                     ;SET C-BIT
2779 016434  106110                             ROLB    (R0)            ;TRY ROLB W/ MODE 1 ODD BYTE
2780 016436  102005                             BVC     ROT1E           ;CC=0011
2781 016440  103004                             BCC     ROT1E
2782 016442  022737  052652  000000             CMP     #052652,@#0     ;CHECK DATA
2783 016450  001406                             BEQ     TST163
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 722           <====
     016452                             ROT1E:
     016452  012762  000360  177776             MOV     #360,-2(R2)     ;MOVE TO MAILBOX #  *******  360  *******
     016460  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     016464  000000                             HALT                    ;ROLB W/ MODE 1 ODD BYTE FAILED
                                                ;  OR SEQUENCE ERROR
2784
```

```
                        ;*******************************************************************************
                        ;
                        ;       THIS TEST VERIFIES MODE 2 ROTATE INSTRUCTIONS.
                        ;THE SAME PROCEDURE AS IN THE OTHER ROTATE TESTS ARE USED.  R0
                        ;IS USED AS THE ADDRESSING REGISTER AND IS CHECKED FOR PROPER
                        ;INCREMENTING.  BYTE INSTRUCTIONS ARE ALSO CHECKED.
                        ;
```

```
2792                                    .SBTTL  TEST # 163 - TEST ROTATE INSTRUCTIONS W/ MODE 2
                                        ;*****************************************************************************
                                        ;TEST 163 - TEST ROTATE INSTRUCTIONS W/ MODE 2
                                        ;*****************************************************************************
     016466  005212                     TST163: INC     (R2)            ;UPDATE TEST NUMBER
     016470  022712  000163                     CMP     #163,(R2)       ;SEQUENCE ERROR?
     016474  001065                             BNE     TST164-10       ;BR TO ERROR HALT ON SEQ ERROR
2793 016476  005000                             CLR     R0              ;POINT TO LOC 0
2794 016500  012710  173737                     MOV     #173737,(R0)    ;INITIALIZE DATA
2795 016504  000241                             CLC                     ;CLEAR C-BIT
2796 016506  006120                             ROL     (R0)+           ;TRY ROL W/ MODE 2
2797 016510  103007                             BCC     ROT2A           ;CHECK C-BIT
2798 016512  022737  167676  000000             CMP     #167676,@#0     ;CHECK DATA
2799 016520  001003                             BNE     ROT2A           ;BRANCH IF RESULT INCORRECT
2800 016522  005300                             DEC     R0              ;TEST R0
2801 016524  005300                             DEC     R0
2802 016526  001406                             BEQ     ROT2B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 762           <====
     016530                             ROT2A:
     016530  012762  000361  177776             MOV     #361,-2(R2)     ;MOVE TO MAILBOX #  *******  361  *******
     016536  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     016542  000000                             HALT                    ;ROL W/ MODE 2 FAILED
2803 016544  005000                     ROT2B:  CLR     R0              ;POINT TO LOC 0
2804 016546  012710  004040                     MOV     #4040,(R0)      ;INITIALIZE DATA
2805 016552  000241                             CLC                     ;CLEAR C-BIT
2306 016554  106120                             ROLB    (R0)+           ;TRY ROLB W/ MODE 2 EVEN BYTE
2807 016556  103406                             BCS     ROT2C           ;CHECK C-BIT
2808 016560  022737  004100  000000             CMP     #4100,@#0       ;CHECK DATA
2809 016566  001002                             BNE     ROT2C           ;BRANCH IF DATA INCORRECT
2810 016570  005300                             DEC     R0              ;CHECK R0
2811 016572  001406                             BEQ     ROT2D
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 740           <====
     016574                             ROT2C:
     016574  012762  000362  177776             MOV     #362,-2(R2)     ;MOVE TO MAILBOX #  *******  362  *******
     016602  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     016606  000000                             HALT                    ;ROLB W/ MODE 2 EVEN BYTE FAILED
2812 016610  005000                     ROT2D:  CLR     R0              ;POINT TO LOC 0
2813 016612  012710  004040                     MOV     #4040,(R0)      ;INITIALIZE DATA
2814 016616  005200                             INC     R0              ;POINT TO ODD BYTE OF DATA
2815 016620  000261                             SEC                     ;SET C-BIT
2816 016622  106120                             ROLB    (R0)+           ;TRY ROL W/ MODE 2 ODD BYTE
2817 016624  103407                             BCS     ROT2E           ;CHECK C-BIT
2818 016626  022737  010440  000000             CMP     #10440,@#0      ;CHECK DATA
2819 016634  001003                             BNE     ROT2E           ;BRANCH IF DATA INCORRECT
2820 016636  005300                             DEC     R0              ;CHECK R0
2821 016640  005300                             DEC     R0
2822 016642  001406                             BEQ     TST164
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 714           <====
```

```
        016644                                  ROT2E:
        016644  012762  000363  177776                  MOV     #363,-2(R2)     ;MOVE TO MAILBOX #  *******  363  *******
        016652  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        016656  000000                                  HALT                    ;ROLB W/ MODE 2 ODD BYTE FAILED
                                                                                ;  OR SEQUENCE ERROR

   2823
   2824                                 ;*************************************************************************************
   2825                                 ;
   2826                                 ;       THIS TEST VERIFIES MODE 3 ROTATE INSTRUCTIONS.
   2827                                 ;THIS TEST USES THE SAME PROCEDURES AS IN THE OTHER ROTATE
   2828                                 ;TESTS.  THE DATA IS STORED IN LOC. 0 AND IS ADDRESSED USING
   2829                                 ;MODE 37.  BYTE ADDRESSING IS ALSO CHECKED FOR EVEN AND ODD BYTES.
   2830                                 ;
```

```
 2831                                   .SBTTL  TEST # 164 - TEST ROTATE INSTRUCTIONS /W MODE 3
                                        ;*****************************************************************************
                                        ;TEST 164 - TEST ROTATE INSTRUCTIONS /W MODE 3
                                        ;*****************************************************************************
      016660  005212                    TST164: INC     (R2)            ;UPDATE TEST NUMBER
      016662  022712  000164                    CMP     #164,(R2)       ;SEQUENCE ERROR?
      016666  001057                            BNE     TST165-10       ;BR TO ERROR HALT ON SEQ ERROR
 2832 016670  012737  052525  000000           MOV     #52525,@#0      ;INITIALIZE DATA IN LOC 0
 2833 016676  000261                            SEC                     ;SET C-BIT
 2834 016700  006137  000000                    ROL     @#0             ;TRO ROL W/ MODE 3
 2835 016704  103404                            BCS     ROT3A           ;CHECK C-BIT
 2836 016706  022737  125253  000000           CMP     #125253,@#0     ;CHECK DATA
 2837 016714  001406                            BEQ     ROT3B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
      016716                            ROT3A:
      016716  012762  000364  177776            MOV     #364,-2(R2)     ;MOVE TO MAILBOX #  *******  364  *******
      016724  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      016730  000000                            HALT                    ;ROL W/ MODE 3 FAILED
 2838 016732  012737  125252  000000  ROT3B:    MOV     #125252,@#0     ;INITIALIZE DATA
 2839 016740  000241                            CLC                     ;CLEAR C-BIT
 2840 016742  106137  000000                    ROLB    @#0             ;TRY ROL W/ MODE 3 EVEN BYTE
 2841 016746  103004                            BCC     ROT3C           ;CHECK C-BIT
 2842 016750  023727  000000  125124  4$:       CMP     @#0,#125124     ;CHECK DATA
 2843 016756  001406                            BEQ     ROT3D
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 743           <====
      016760                            ROT3C:
      016760  012762  000365  177776            MOV     #365,-2(R2)     ;MOVE TO MAILBOX #  *******  365  *******
      016766  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      016772  000000                            HALT                    ;ROL W/ MODE 3 EVEN BYTE FAILED
 2844 016774  012737  125252  000000  ROT3D:    MOV     #125252,@#0     ;INITIALIZE DATA IN LOC. 0
 2845 017002  000261                            SEC                     ;SET C-BIT
 2846 017004  106137  000001                    ROLB    @#1             ;TRY ROL W/ MODE 3 ODD BYTE
 2847 017010  103004                            BCC     ROT3E           ;CHECK C-BIT
 2848 017012  022737  052652  000000           CMP     #052652,@#0     ;CHECK DATA
 2849 017020  001406                            BEQ     TST165
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 722           <====
      017022                            ROT3E:
      017022  012762  000366  177776            MOV     #366,-2(R2)     ;MOVE TO MAILBOX #  *******  366  *******
      017030  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      017034  000000                            HALT                    ;ROL W/ MODE 3 ODD BYTE FAILED
                                                                        ;  OR SEQUENCE ERROR
 2850
 2851                                   ;*****************************************************************************
 2852                                   ;
 2853                                   ;       THIS TEST VERIFIES MODE 4 ROTATE INSTRUCTIONS.  THE DATA IS
 2854                                   ;STORED IN LOC. 0.  R0 IS SET TO 2 AND THE CARRY IS SET.  AN ROL MODE 4
 2855                                   ;IS USED TO ROTATE LOCATION 0 USING R0.  THE DATA IS CHECKED
 2856                                   ;AND THE C AND V BITS ARE TESTED.  THE PROPER DECREMENTING OF
```

```
2857                                    ;R0 IS VERIFIED.
2858                                    ;
```

```
2859                                    .SBTTL  TEST # 165 - TEST MODE 4 W/ ROTATE INSTRUCTIONS
                                        ;*****************************************************************************
                                        ;TEST 165 - TEST MODE 4 W/ ROTATE INSTRUCTIONS
                                        ;*****************************************************************************
     017036  005212                     TST165: INC     (R2)            ;UPDATE TEST NUMBER
     017040  022712  000165                     CMP     #165,(R2)       ;SEQUENCE ERROR?
     017044  001020                             BNE     TST166-10       ;BR TO ERROR HALT ON SEQ ERROR
2860 017046  012737  070707  000000             MOV     #070707,@#0     ;INITIALIZE DATA IN LOC. 0
2861 017054  012700  000002                     MOV     #2,R0           ;INITIALIZE R0 AS POINTER
2862 017060  000261                             SEC                     ;SET C-BIT
2863 017062  006140                             ROL     -(R0)           ;TRY ROL W/ MODE 4
2864 017064  103406                             BCS     ROT4            ;CHECK C-BIT
2865 017066  022737  161617  000000             CMP     #161617,@#0     ;CHECK DATA
2866 017074  001002                             BNE     ROT4            ;BRANCH IF DATA INCORRECT
2867 017076  005700                             TST     R0              ;CHECK MODE 4 REGISTER
2868 017100  001406                             BEQ     TST166
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 761           <====
     017102                             ROT4:
     017102  012762  000367  177776             MOV     #367,-2(R2)     ;MOVE TO MAILBOX #  *******  367  *******
     017110  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     017114  000000                             HALT                    ;ROL MODE 4 FAILED
                                                                        ;  OR SEQUENCE ERROR
2869
2870                                    ;*****************************************************************************
2871                                    ;
2872                                    ;       THIS TEST VERIFIES MODE 5 ROTATE INSTRUCTIONS.
2873                                    ;THE DATA IS STORED IN A WORK LOCATION (ROTX) AT THE END OF THE
2874                                    ;TEST CODE.  LOC. 0 IS LOADED WITH THE ADDRESS OF THE DATA (ROTX).
2875                                    ;R0 IS SET TO 2.  THE CARRY IS CLEARED AND A MODE 5 ROL
2876                                    ;IS EXECUTED USING R0 AS AN ADDRESSING REGISTER.  THE DATA IS
2877                                    ;CHECKED, THE C AND V BITS TESTED, AND R0 CHECKED FOR PROPER
2878                                    ;DECREMENTING.
2879                                    ;
```

TEST # 166 - TEST MODE 5 W/ ROTATE INSTRUCTIONS

```
2880                                    .SBTTL  TEST # 166 - TEST MODE 5 W/ ROTATE INSTRUCTIONS
                                        ;*************************************************************************
                                        ;TEST 166 - TEST MODE 5 W/ ROTATE INSTRUCTIONS
                                        ;*************************************************************************
 017116  005212                        TST166: INC     (R2)            ;UPDATE TEST NUMBER
 017120  022712  000166                         CMP     #166,(R2)       ;SEQUENCE ERROR?
 017124  001021                         BNE     ROT5            ;BR TO ERROR HALT ON SEQ ERROR
2881 017126  012737  017204  000000     MOV     #ROTX,@#0       ;MOVE POINTER TO LOC. 0
2882 017134  012700  000002            MOV     #2,R0           ;SET MODE 5 REG. TO LOC. 0
2883 017140  012767  107070  000036     MOV     #107070,ROTX    ;INITIALIZE DATA
2884 017146  000241                    CLC                     ;CLEAR C-BIT
2885 017150  006150                    ROL     @-(R0)          ;TRY ROL W/ MODE 5
2886 017152  103006                    BCC     ROT5            ;CHECK C-BIT
2887 017154  022737  016160  017204     CMP     #016160,@#ROTX  ;CHECK DATA
2888 017162  001002                    BNE     ROT5            ;BRANCH IF DATA INCORRECT
2889 017164  005700                    TST     R0              ;CHECK MODE 5 REGISTER
2890 017166  001407                    BEQ     TST167
                                                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                               ;           CONDITIONAL BRANCH INST. AND   <====
                                                               ;           REPLACE THE MOVE INSTRUCTION   <====
                                                               ;           WHICH FOLLOWS W/ 756           <====
 017170                                ROT5:
 017170  012762  000370  177776         MOV     #370,-2(R2)     ;MOVE TO MAILBOX #  *******  370  *******
 017176  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 017202  000000                         HALT                    ;ROL MODE 5 FAILED
                                                                ;  OR SEQUENCE ERROR
2891 017204  000000                    ROTX:   0
2892
2893                                    ;*************************************************************************
2894                                    ;
2895                                    ;       THIS TEST VERIFIES MODE 6 ROTATE INSTRUCTIONS.
2896                                    ;IT USES THE SAME PROCEDURE AS THE ABOVE TEST EXCEPT THE
2897                                    ;ROTATE INSTRUCTION USES MODE 6 ADDRESSING WITH REGISTER 7.
2898                                    ;THE DATA IS STILL OPERATED ON IN LOC. ROTX (SEE PREVIOUS TEST).
2899                                    ;
```

```
                                .SBTTL  TEST # 167 - TEST MODE 6 W/ ROTATE INSTRUCTIONS
                                ;*****************************************************************************
                                ;TEST 167 - TEST MODE 6 W/ ROTATE INSTRUCTIONS
                                ;*****************************************************************************
017206  005212                  TST167: INC     (R2)            ;UPDATE TEST NUMBER
017210  022712  000167                  CMP     #167,(R2)       ;SEQUENCE ERROR?
017214  001015                          BNE     TST170-10       ;BR TO ERROR HALT ON SEQ ERROR
2901 017216  012737  125252  017204     MOV     #125252,@#ROTX  ;INITIALIZE DATA
2902 017224  000261                     SEC                     ;SET C-BIT
2903 017226  006167  177752             ROL     ROTX            ;TRY ROL W/ MODE 6
2904 017232  103004                     BCC     ROT6            ;CHECK C-BIT
2905 017234  022737  052525  017204     CMP     #52525,@#ROTX   ;CHECK DATA
2906 017242  001406                     BEQ     TST170
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 764           <====
017244                          ROT6:
017244  012762  000371  177776          MOV     #371,-2(R2)     ;MOVE TO MAILBOX #  *******  371  *******
017252  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
017256  000000                          HALT                    ;ROL W/ MODE 6 FAILED
                                                                ;  OR SEQUENCE ERROR
2907
2908                            ;*****************************************************************************
2909                            ;
2910                            ;THIS TEST VERIFIES MODE 7 ROTATE INSTRUCTIONS.
2911                            ;THE DATA IS SET IN LOC. ROTX, (SEE PREVIOUS TEST).  THE ROL INSTRUCTION
2912                            ;ADDRESSES IT INDIRECTLY USING MODE 7 AND INDIRECT ADDRESS LOCATION
2913                            ;(ROTXAD) FOLLOWING THE TEST CODE.
2914                            ;
```

```
                                .SBTTL  TEST # 170 - TEST MODE 7 W/ ROTATE INSTRUCTIONS
                                ;*****************************************************************************
                                ;TEST 170 - TEST MODE 7 W/ ROTATE INSTRUCTIONS
                                ;*****************************************************************************
 017260  005212                 TST170: INC     (R2)            ;UPDATE TEST NUMBER
 017262  022712  000170                 CMP     #170,(R2)       ;SEQUENCE ERROR?
 017266  001016                         BNE     ROT7            ;BR TO ERROR HALT ON SEQ ERROR
2916 017270  012737  052525  017204     MOV     #52525,@#ROTX   ;INITIALIZE DATA
2917 017276  012737  017204  017340     MOV     #ROTX,@#ROTXAD  ;INITIALIZE ADDRESS POINTER
2918 017304  000241                     CLC                     ;CLEAR C-BIT
2919 017306  006177  000026             ROL     @ROTXAD         ;TRY ROL W/ MODE 7
2920 017312  103404                     BCS     ROT7            ;CHECK C-BIT
2921 017314  023727  017204  125252     CMP     @#ROTX,#125252  ;CHECK DATA
2922 017322  001407                     BEQ     TST171
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 761           <====
 017324                         ROT7:
 017324  012762  000372  177776         MOV     #372,-2(R2)     ;MOVE TO MAILBOX #  *******  372  *******
 017332  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 017336  000000                         HALT                    ;ROL W/ MODE 7 FAILED
                                                                ;  OR SEQUENCE ERROR
2923 017340  000000             ROTXAD: 0
2924
2925
2926                            ;*****************************************************************************
2927                            ;
2928                            ;       THIS TEST VERIFIES MODE 0 SWAB INSTRUCTION.  R0 IS SET TO
2929                            ;177400.  A SWAB MODE 0 IS EXECUTED AND THE CONDITIONAL BRANCH
2930                            ;IS USED TO CHECK THE SIGN OF THE RESULT.  ALSO, A COMPARISON
2931                            ;IS MADE TO CHECK THE DATA RESULTS.
2932                            ;
```

```
2933                                    .SBTTL  TEST # 171 - TEST MODE 0 W/ SWAB INST.
                                        ;*****************************************************************************
                                        ;TEST 171 - TEST MODE 0 W/ SWAB INST.
                                        ;*****************************************************************************
     017342  005212                     TST171: INC     (R2)            ;UPDATE TEST NUMBER
     017344  022712  000171                     CMP     #171,(R2)       ;SEQUENCE ERROR?
     017350  001017                             BNE     TST172-10       ;BR TO ERROR HALT ON SEQ ERROR
2934 017352  012700  177400                     MOV     #177400,R0      ;MOVE TEST PATTERN TO R0
2935 017356  000300                             SWAB    R0              ;TRY SWAB MODE 0
2936 017360  100406                             BMI     SB0
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 773           <====
     017362  012762  000373  177776             MOV     #373,-2(R2)     ;MOVE TO MAILBOX #  *******  373  *******
     017370  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     017374  000000                             HALT                    ;SWAB DID NOT SET CC'S CORRECT
2937 017376  022700  000377             SB0:    CMP     #377,R0         ;CHECK RESULT
2938 017402  001406                             BEQ     TST172
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 762           <====
     017404  012762  000374  177776             MOV     #374,-2(R2)     ;MOVE TO MAILBOX #  *******  374  *******
     017412  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     017416  000000                             HALT                    ;RESULT OF SWAB MODE 0 FAILED
                                                                        ;  OR SEQUENCE ERROR
2939
2940                                    ;*****************************************************************************
2941                                    ;
2942                                    ;       THIS TEST VERIFIES MODE 1 SWAB INSTRUCTION.  THE TEST
2943                                    ;PATTERN IS MOVED TO LOC 0.  R0 IS CLEARED AND USED AS THE ADDRESSING
2944                                    ;REGISTER IN THE MODE 1 SWAB.  THE DATA RESULTS ARE CHECKED WITH
2945                                    ;A COMPARE.
2946                                    ;
```

```
                                .SBTTL  TEST # 172 - TEST MODE 1 W/ SWAB INST
                                ;*****************************************************************************
                                ;TEST 172 - TEST MODE 1 W/ SWAB INST
                                ;*****************************************************************************
                                ;
017420  005212                  TST172: INC     (R2)            ;UPDATE TEST NUMBER
017422  022712  000172                  CMP     #172,(R2)       ;SEQUENCE ERROR?
017426  001013                          BNE     TST173-10       ;BR TO ERROR HALT ON SEQ ERROR
2948 017430  012737  125652  000000     MOV     #125652,@#0     ;MOVE TEST PATTERN TO LOC. 0
2949 017436  005000                     CLR     R0              ;R0=0
2950 017440  000310                     SWAB    (R0)            ;TRY SWAB MODE 1
2951 017442  022737  125253  000000     CMP     #125253,@#0     ;CHECK RESULT
2952 017450  001406                     BEQ     TST173
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 766           <====
017452  012762  000375  177776          MOV     #375,-2(R2)     ;MOVE TO MAILBOX #  *******  375  *******
017460  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
017464  000000                          HALT                    ;RESULT OF SWAB MODE 1 FAILED
                                                                ;  OR SEQUENCE ERROR
2953
2954
2955                            ;*****************************************************************************
2956                            ;
2957                            ;       THIS TEST VERIFIES MODE 2 SWAB INSTRUCTION.  THE TEST
2958                            ;PATTERN IS MOVED TO LOC 0.  R0 IS CLEARED AND USED AS THE MODE
2959                            ;2 ADDRESSING REGISTER.  THE RESULTS ARE CHECKED WITH A COMPARE.
2960                            ;R0 IS CHECKED FOR PROPER DECREMENTING.
2961                            ;
```

```
2962                                    .SBTTL  TEST # 173 - TEST MODE 2 W/ SWAB INST
                                        ;*****************************************************************************
                                        ;TEST 173 - TEST MODE 2 W/ SWAB INST
                                        ;*****************************************************************************
        017466  005212                  TST173: INC     (R2)            ;UPDATE TEST NUMBER
        017470  022712  000173                  CMP     #173,(R2)       ;SEQUENCE ERROR?
        017474  001024                          BNE     TST174-10       ;BR TO ERROR HALT ON SEQ ERROR
2963    017476  012737  125152  000000          MOV     #125152,@#0     ;MOVE TEST PATTERN TO LOC. 0
2964    017504  005000                          CLR     R0              ;R0=0
2965    017506  000320                          SWAB    (R0)+           ;TRY SWAB MODE 2
2966    017510  022737  065252  000000          CMP     #65252,@#0      ;CHECK RESULT
2967    017516  001406                          BEQ     SB2
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 766           <====
        017520  012762  000376  177776          MOV     #376,-2(R2)     ;MOVE TO MAILBOX #  *******  376  *******
        017526  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        017532  000000                          HALT                    ;RESULT OF SWAB MODE 0 FAILED
2968    017534  162700  000002          SB2:    SUB     #2,R0           ;CHECK EFFECT OF REG.
2969    017540  001406                          BEQ     TST174
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 755           <====
        017542  012762  000377  177776          MOV     #377,-2(R2)     ;MOVE TO MAILBOX #  *******  377  *******
        017550  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        017554  000000                          HALT                    ;REGISTER VALUE INCORRECT
                                                                        ;  OR SEQUENCE ERROR
2970
2971
2972                                    ;*****************************************************************************
2973                                    ;
2974                                    ;       THIS TEST VERIFIES MODE 3 SWAB INSTRUCTION.  THE TEST
2975                                    ;PATTERN IS MOVED TO LOC 0.  A MODE 3 SWAB INSTRUCTION IS EXECUTED
2976                                    ;USING R7 AS THE ADDRESSING REGISTER.  A COMPARE VERIFIES THE
2977                                    ;DATA RESULTS.
2978                                    ;
```

```
                                .SBTTL  TEST # 174 - TEST MODE 3 W/SWAB INST.
                                ;******************************************************************************
                                ;TEST 174 - TEST MODE 3 W/SWAB INST.
                                ;******************************************************************************
017556  005212                TST174: INC     (R2)            ;UPDATE TEST NUMBER
017560  022712  000174              CMP     #174,(R2)       ;SEQUENCE ERROR?
017564  001013                      BNE     TST175-10       ;BR TO ERROR HALT ON SEQ ERROR
2980 017566  012737  000377  000000  MOV     #377,@#0        ;MOVE TEST PATTERN TO LOC. 0
2981 017574  000337  000000          SWAB    @#0             ;TRY SWAB W/ MODE 3
2982 017600  022737  177400  000000  CMP     #177400,@#0     ;CHECK RESULT
2983 017606  001406                  BEQ     TST175
                                                            ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                            ;           CONDITIONAL BRANCH INST. AND   <====
                                                            ;           REPLACE THE MOVE INSTRUCTION   <====
                                                            ;           WHICH FOLLOWS W/ 766           <====
017610  012762  000400  177776      MOV     #400,-2(R2)     ;MOVE TO MAILBOX #  *******  400  *******
017616  005262  177774              INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
017622  000000                      HALT                    ;RESULT OF SWAB INCORRECT
                                                            ;  OR SEQUENCE ERROR
2984
2985
2986                            ;******************************************************************************
2987                            ;
2988                            ;       THIS TEST VERIFIES MODE 4 SWAB INSTRUCTIONS.  THE DATA
2989                            ;IS MOVED TO LOC 0.  R0 IS SET TO 2 AND USED AS THE MODE 4 ADDRESSING
2990                            ;REGISTER.  THE DATA IS CHECKED WITH A COMPARE AND R0 IS CHECKED
2991                            ;FOR PROPER DECREMENTING.
2992                            ;
```

```
2993                                    .SBTTL  TEST # 175 - TEST MODE 4 W/ SWAB INST
                                        ;*****************************************************************************
                                        ;TEST 175 - TEST MODE 4 W/ SWAB INST
                                        ;*****************************************************************************
     017624  005212                     TST175: INC     (R2)            ;UPDATE TEST NUMBER
     017626  022712  000175                     CMP     #175,(R2)       ;SEQUENCE ERROR?
     017632  001024                             BNE     TST176-10       ;BR TO ERROR HALT ON SEQ ERROR
2994 017634  012737  125652  000000             MOV     #125652,@#0     ;MOVE TEST PATTERN TO LOC. 0
2995 017642  012700  000002                     MOV     #2,R0           ;SET UP REGISTER POINTER
2996 017646  000340                             SWAB    -(R0)           ;TRY SWAB MODE 4
2997 017650  022737  125253  000000             CMP     #125253,@#0     ;CHECK RESULT
2998 017656  001406                             BEQ     SB4
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 765           <====
     017660  012762  000401  177776             MOV     #401,-2(R2)     ;MOVE TO MAILBOX #  *******  401  *******
     017666  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     017672  000000                             HALT                    ;RESULT OF SWAB INCORRECT
2999 017674  005700                     SB4:    TST     R0              ;CHECK EFFECT ON REG.
3000 017676  001406                             BEQ     TST176
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 755           <====
     017700  012762  000402  177776             MOV     #402,-2(R2)     ;MOVE TO MAILBOX #  *******  402  *******
     017706  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     017712  000000                             HALT                    ;REGISTER VALUE INCORRECT
                                                                        ;  OR SEQUENCE ERROR
3001
3002
3003                                    ;*****************************************************************************
3004                                    ;
3005                                    ;       THIS TEST VERIFIES MODE 5 SWAB INSTRUCTION.  THE TEST USES
3006                                    ;TWO LOCATIONS FOLLOWING THE TEST CODE.  SB5X HOLDS THE DATA;
3007                                    ;SB5XAD IS A POINTER TO THE DATA LOCATION.  THE DATA IS MOVED TO
3008                                    ;SB5X AND R0 IS SET TO TWO PLUS THE ADDRESS OF SB5XAD.  FOLLOWING
3009                                    ;THE MODE 5 SWAB SB5X IS CHECKED FOR THE PROPER DATA.  R0 IS
3010                                    ;CHECKED TO SEE THAT IT WAS DECREMENTED PROPERLY.
3011                                    ;
```

```
3012                                    .SBTTL  TEST # 176 - TEST MODE 5 W/ SWAB INST.
                                        ;*************************************************************************
                                        ;TEST 176 - TEST MODE 5 W/ SWAB INST.
                                        ;*************************************************************************
     017714  005212                     TST176: INC     (R2)            ;UPDATE TEST NUMBER
     017716  022712  000176                     CMP     #176,(R2)       ;SEQUENCE ERROR?
     017722  001023                             BNE     SB5             ;BR TO ERROR HALT ON SEQ ERROR
3013 017724  012700  020012                     MOV     #SB5XAD+2,R0    ;SET UP POINTER TO WORK LOCATION
3014 017730  012767  125125  000050             MOV     #125125,SB5X    ;MOVE PATTERN TO WORK LOCATION
3015 017736  000350                             SWAB    @-(R0)          ;TRY SWAB MODE 5
3016 017740  022767  052652  000040             CMP     #52652,SB5X     ;CHECK RESULT
3017 017746  001406                             BEQ     SB5A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 765           <====
     017750  012762  000403  177776             MOV     #403,-2(R2)     ;MOVE TO MAILBOX #  *******  403  *******
     017756  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     017762  000000                             HALT                    ;RESULT OF SWAB INCORRECT
3018 017764  020027  020010             SB5A:   CMP     R0,#SB5XAD      ;CHECK RESULT OF REG.
3019 017770  001410                             BEQ     TST177
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 754           <====
     017772                             SB5:
     017772  012762  000404  177776             MOV     #404,-2(R2)     ;MOVE TO MAILBOX #  *******  404  *******
     020000  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     020004  000000                             HALT                    ;REGISTER VALUE INCORRECT
                                                                        ;  OR SEQUENCE ERROR
3020 020006  000000                     SB5X:   0                       ;WORK LOCATION
3021 020010  020006                     SB5XAD: SB5X
3022
3023
3024                                    ;*************************************************************************
3025                                    ;
3026                                    ;       THIS TEST VERIFIES MODE 6 SWAB INSTRUCTION.  THIS TEST
3027                                    ;USES A WORK LOCATION (SB6X) FOLLOWING THE TEST CODE.  TEST DATA
3028                                    ;IS LOADED INTO THE WORK LOCATION.  R0, THE ADDRESSING REGISTER
3029                                    ;IS LOADED WITH 6 LESS THEN THE ADDRESS OF THE WORK LOCATION.
3030                                    ;THE MODE 6 SWAB IS EXECUTED WITH A +6 OFFSET.  THE DATA IS
3031                                    ;VERIFIED WITH A COMPARE.
3032                                    ;
```

```
                                .SBTTL  TEST # 177 - TEST MODE 6 W/ SWAB INST.
                                ;*************************************************************************
                                ;TEST 177 - TEST MODE 6 W/ SWAB INST.
                                ;*************************************************************************
020012  005212                  TST177: INC     (R2)            ;UPDATE TEST NUMBER
020014  022712  000177                  CMP     #177,(R2)       ;SEQUENCE ERROR?
020020  001013                          BNE     SB6             ;BR TO ERROR HALT ON SEQ ERROR
3034 020022  012767  125125  000034     MOV     #125125,SB6X    ;MOVE PATTERN TO WORK LOCATION
3035 020030  012700  020056             MOV     #SB6X-6,R0      ;MOVE OFFSET POINTER TO R0
3036 020034  000360  000006             SWAB    6(R0)           ;TRY SWAB W/ MODE 6
3037 020040  022760  052652  000006     CMP     #52652,6(R0)    ;CHECK RESULT
3038 020046  001407                     BEQ     TST200
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 764           <====
020050                          SB6:
020050  012762  000405  177776             MOV     #405,-2(R2)     ;MOVE TO MAILBOX #  *******  405  *******
020056  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
020062  000000                             HALT                    ;RESULT OF SWAB INCORRECT
                                                                    ;  OR SEQUENCE ERROR
3039 020064  000000             SB6X:   0                       ;WORK LOCATION
3040
3041
3042                            ;*************************************************************************
3043                            ;
3044                            ;       THIS TEST VERIFIES MODE 7 SWAB INSTRUCTION.  THIS TEST
3045                            ;USES TWO LOCATIONS FOLLOWING THE TEST CODE:  A WORK LOCATION
3046                            ;(SB7X) AND A POINTER TO THE WORK LOCATION (SB7XAD).  DATA IS MOVED
3047                            ;TO THE WORK LOCATION.  R0 IS LOADED WITH 72 LESS THAN THE ADDRESS
3048                            ;OF THE ADDRESS POINTER.  THE DATA IS SWAB'ED USING A MODE 7
3049                            ;INSTRUCTION WITH AN OFFSET OF +72.  THE DATA IS VERIFIED WITH A
3050                            ;COMPARE.
3051                            ;
```

TEST # 200 - TEST MODE 7 W/ SWAB INST.

```
3052                                    .SBTTL  TEST # 200 - TEST MODE 7 W/ SWAB INST.
                                        ;*************************************************************************
                                        ;TEST 200 - TEST MODE 7 W/ SWAB INST.
                                        ;*************************************************************************
      020066  005212                    TST200: INC     (R2)            ;UPDATE TEST NUMBER
      020070  022712  000200                    CMP     #200,(R2)       ;SEQUENCE ERROR?
      020074  001013                            BNE     SB7             ;BR TO ERROR HALT ON SEQ ERROR
3053  020076  012767  177400  000034          MOV     #177400,SB7X    ;MOVE PATTERN TO WORK LOCATION
3054  020104  012700  020050                  MOV     #SB7XAD-72,R0   ;MOVE OFFSET POINTER TO R0
3055  020110  000370  000072                  SWAB    @72(R0)         ;TRY SWAB MODE 7
3056  020114  027027  000072  000377          CMP     @72(R0),#377    ;CHECK RESULTS
3057  020122  001410                          BEQ     TST201
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
      020124                            SB7:
      020124  012762  000406  177776          MOV     #406,-2(R2)     ;MOVE TO MAILBOX #  *******  406  *******
      020132  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      020136  000000                          HALT                    ;RESULT OF SWAB INCORRECT
                                                                      ;  OR SEQUENCE ERROR
3058  020140  000000                    SB7X:   0                       ;WORK LOCATION
3059  020142  020140                    SB7XAD: SB7X                    ;POINTER TO WORK LOCATION
3060
3061
3062                                    ;*************************************************************************
3063                                    ;
3064                                    ;       THIS TEST VERIFIES ALL LEGAL MODES OF THE JMP INSTRUCTION.
3065                                    ;BECAUSE OF THE NATURE OF THE INSTRUCTION UNDER TEST, THIS TEST
3066                                    ;UTILIZES SEVERAL DIFFERENT TECHNIQUES.  THE CODE IS NOT EXECUTED
3067                                    ;IN A LINEAR FASHION.  THE DIFFERENT MODES ARE EXECUTED IN ORDER
3068                                    ;FROM 1-7; HOWEVER, THE CODE IS ARRANGED SO THAT CONTROL LEAP
3069                                    ;FROGS THRU THE TEST CODE.  THE ORDER OF APPEARANCE OF THE CODE
3070                                    ;IS:
3071                                    ;       JMP MODE 1
3072                                    ;       JMP MODE 3
3073                                    ;       JMP MODE 2
3074                                    ;       JMP MODE 4
3075                                    ;       JMP MODE 6
3076                                    ;       JMP MODE 5
3077                                    ;       JMP MODE 7
3078                                    ;AN INTERNAL SEQUENCE TEST (JMPSEQ) IS USED TO INSURE THAT THE
3079                                    ;JUMPS ARE OCCURRING IN THE PROGRAMMED SEQUENCE.
3080                                    ;       THE TEST IS MADE UP OF SEVERAL BLOCKS OF CODE.  EACH CODE
3081                                    ;BEGINS WITH A LABEL WHICH INDICATES THE MODE BEING EXECUTED IN
3082                                    ;THAT BLOCK.  A SIMPLE PROCEDURE IS FOLLOWED IN EACH BLOCK.  FOR
3083                                    ;EXAMPLE THE CODE BEGINNING AT JMP3 WILL FIRST COMPARE THE RESULTS
3084                                    ;OF THE PREVIOUS MODE 2 JUMP.  (ANY REGISTER CHANGES ARE VERIFIED
3085                                    ;AND THE SEQUENCE CHECK IS MADE).  THEN THE REGISTERS ARE SETUP
3086                                    ;FOR A MODE 3 JUMP TO THE NEXT TEST BLOCK (HERE, JMP4), THE SEQUENCE
3087                                    ;CHECKER IS UPDATED AND THE JUMP IS EXECUTED.
3088                                    ;       IF A FAILURE OCCURS, THE SEQUENCE CHECKER WILL ASSIST IN
3089                                    ;DETERMINING JUST WHICH MODE FAILED.  IF THE SEQUENCE IS CORRECT
3090                                    ;THEN THE ERROR DETECTED WAS A MODE FAILURE (E.G. FAILURE OF THE
3091                                    ;REGISTER TO BE INCREMENTED IN MODE 2 JUMP.)
3092                                    ;
```

```
3093                                    .SBTTL  TEST # 201 - TEST THE JMP INSTRUCTION IN ALL MODES
                                        ;*****************************************************************************
                                        ;TEST 201 - TEST THE JMP INSTRUCTION IN ALL MODES
                                        ;*****************************************************************************
     020144  005212                     TST201: INC     (R2)            ;UPDATE TEST NUMBER
     020146  022712  000201                     CMP     #201,(R2)       ;SEQUENCE ERROR?
     020152  001170                             BNE     JMPCK+6         ;BR TO ERROR HALT ON SEQ ERROR
3094 020154  005067  000372                     CLR     JMPSEQ          ;ESTABLISH A SEQUENCE CHECKER
3095 020160  012700  020250                     MOV     #JMP2,R0        ;SET R0=JUMP TARGET
3096 020164  000110                             JMP     (R0)            ;TRY JMP MODE 1
3097 020166  022700  020170             JMP3:   CMP     #.+2,R0         ;CHECK RESULT OF MODE 2 JUMP
3098 020172  001406                             BEQ     JMP3A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 767           <====
     020174  012762  000407  177776             MOV     #407,-2(R2)     ;MOVE TO MAILBOX #  *******  407  *******
     020202  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     020206  000000                             HALT                    ;REGISTER VALUE AFTER JMP MODE 2 INCORRECT
3099 020210  026727  000336  000001     JMP3A:  CMP     JMPSEQ,#1       ;MAKE SURE JMPS ARE IN SEQUENCE: JMPSEQ=1?
3100 020216  001406                             BEQ     JMP3B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 755           <====
     020220  012762  000410  177776             MOV     #410,-2(R2)     ;MOVE TO MAILBOX #  *******  410  *******
     020226  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     020232  000000                             HALT                    ;SHOULD BE HERE FROM JMP MODE 2 ONLY
3101 020234  012700  020246             JMP3B:  MOV     #IJMP4,R0       ;POINT R0 TO INDIRECT JMP ADDR.
3102 020240  005267  000306                     INC     JMPSEQ          ;UPDATE SEQUENCE CHECKER
3103 020244  000130                             JMP     @(R0)+          ;TRY JMP MODE 3
3104 020246  020304                     IJMP4:  JMP4                    ;ADDRESS INDIRECT JUMP
3105
3106 020250  005767  000276             JMP2:   TST     JMPSEQ          ;CHECK THAT JMPS ARE IN SEQUENCE: JMPSEQ=0?
3107 020254  001406                             BEQ     JMP2A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 736           <====
     020256  012762  000411  177776             MOV     #411,-2(R2)     ;MOVE TO MAILBOX #  *******  411  *******
     020264  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     020270  000000                             HALT                    ;SHOULD BE HERE FROM JMP MODE 1 ONLY
3108 020272  005267  000254             JMP2A:  INC     JMPSEQ          ;UPDATE SEQUENCE CHECKER
3109 020276  012700  020166                     MOV     #JMP3,R0        ;SET R0=JUMP TARGET
3110 020302  000120                             JMP     (R0)+           ;TRY A JUMP MODE 2 TO ''JMP3''
3111 020304  022700  020250             JMP4:   CMP     #IJMP4+2,R0     ;CHECK RESULT OF REGISTER IN MODE 3 JUMP
3112 020310  001406                             BEQ     JMP4A
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 720           <====
     020312  012762  000412  177776             MOV     #412,-2(R2)     ;MOVE TO MAILBOX #  *******  412  *******
     020320  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     020324  000000                             HALT                    ;REGISTER VALUE AFTER MODE 3 JUMP INCORRECT
3113 020326  022767  000002  000216     JMP4A:  CMP     #2,JMPSEQ       ;CHECK JUMP SEQUENCE: JMPSEQ=2?
3114 020334  001406                             BEQ     JMP4B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
```

```
                                                        ;            CONDITIONAL BRANCH INST. AND   <====
                                                        ;            REPLACE THE MOVE INSTRUCTION   <====
                                                        ;            WHICH FOLLOWS W/ 706           <====
     020336  012762  000413  177776          MOV     #413,-2(R2)    ;MOVE TO MAILBOX #  *******  413  *******
     020344  005262  177774                  INC     -4(R2)         ;SET MSGTYP TO FATAL ERROR
     020350  000000                          HALT                   ;SHOULD BE ONLY FROM MODE 3 JUMP
3115 020352  012700  020426          JMP4B:  MOV     #JMP5+2,R0     ;SET UP POINTER TO JUMP TARGET
3116 020356  005267  000170                  INC     JMPSEQ         ;UPDATE SEQUENCE CHECKER
3117 020362  000140                          JMP     -(R0)          ;TRY JUMP MODE 4 TO ''JMP4''
3118
3119 020364  022767  000004  000160  JMP6:   CMP     #4,JMPSEQ      ;CHECK THAT JUMPS ARE IN SEQUENCE: JMPSEQ=4?
3120 020372  001406                          BEQ     JMP6A
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;            CONDITIONAL BRANCH INST. AND   <====
                                                        ;            REPLACE THE MOVE INSTRUCTION   <====
                                                        ;            WHICH FOLLOWS W/ 667           <====
     020374  012762  000414  177776          MOV     #414,-2(R2)    ;MOVE TO MAILBOX #  *******  414  *******
     020402  005262  177774                  INC     -4(R2)         ;SET MSGTYP TO FATAL ERROR
     020406  000000                          HALT                   ;SHOULD BE HERE ONLY FROM MODE 5 JUMP
3121 020410  012700  021062          JMP6A:  MOV     #JMP7+376,R0   ;SET UP OFFSET POINTER TO JUMP TARGET
3122 020414  005267  000132                  INC     JMPSEQ         ;UPDATE JUMP SEQUENCE
3123 020420  000160  177402                  JMP     -376(R0)       ;TRY MODE 6 JUMP
3124
3125 020424  022767  000003  000120  JMP5:   CMP     #3,JMPSEQ      ;CHECK THAT JUMPS ARE IN SEQUENCE: JMPSEQ=3?
3126 020432  001406                          BEQ     JMP5A
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;            CONDITIONAL BRANCH INST. AND   <====
                                                        ;            REPLACE THE MOVE INSTRUCTION   <====
                                                        ;            WHICH FOLLOWS W/ 647           <====
     020434  012762  000415  177776          MOV     #415,-2(R2)    ;MOVE TO MAILBOX #  *******  415  *******
     020442  005262  177774                  INC     -4(R2)         ;SET MSGTYP TO FATAL ERROR
     020446  000000                          HALT                   ;SHOULD ONLY BE HERE FROM MODE 4 JUMP
3127 020450  012700  020464          JMP5A:  MOV     #IJMP5+2,R0    ;SET UP POINTER TO INDIRECT JUMP ADDR.
3128 020454  005267  000072                  INC     JMPSEQ         ;UPDATE JUMP SEQUENCE
3129 020460  000150                          JMP     @-(R0)         ;TRY JUMP MODE 5 TO ''JMP6''
3130 020462  020364                  IJMP5:  JMP6                   ;INDIRECT ADDRESS POINTER
3131
3132 020464  022767  000005  000060  JMP7:   CMP     #5,JMPSEQ      ;CHECK JUMPS IN SEQUENCE: JMPSEQ=5?
3133 020472  001406                          BEQ     JMP7A
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;            CONDITIONAL BRANCH INST. AND   <====
                                                        ;            REPLACE THE MOVE INSTRUCTION   <====
                                                        ;            WHICH FOLLOWS W/ 627           <====
     020474  012762  000416  177776          MOV     #416,-2(R2)    ;MOVE TO MAILBOX #  *******  416  *******
     020502  005262  177774                  INC     -4(R2)         ;SET MSGTYP TO FATAL ERROR
     020506  000000                          HALT                   ;SHOULD ONLY BE HERE FROM MODE 6 JUMP
3134 020510  012700  020534          JMP7A:  MOV     #IJMP+10,R0    ;SET UP OFFSET POINTER TO INDIRECT ADDR.
3135 020514  005267  000032                  INC     JMPSEQ         ;UPDATE JUMP SEQUENCE
3136 020520  000170  177770                  JMP     @-10(R0)       ;TRY MODE 7 JUMP
3137 020524  020526                  IJMP:   JMPCK                  ;INDIRECT ADDRESS
3138
3139 020526  026727  000020  000006  JMPCK:  CMP     JMPSEQ,#6      ;CHECK JUMPS IN SEQUENCE: JMPSEQ
3140 020534  001407                          BEQ     TST202
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;            CONDITIONAL BRANCH INST. AND   <====
                                                        ;            REPLACE THE MOVE INSTRUCTION   <====
                                                        ;            WHICH FOLLOWS W/ 606           <====
```

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020536  012762  000417  177776          MOV     #417,-2(R2)     ;MOVE TO MAILBOX #  *******  417  *******
020544  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
020550  000000                          HALT                    ;SHOULD ONLY BE HERE FROM MODE 6 JUMP
                                                                ;  OR SEQUENCE ERROR
3141 020552  000000              JMPSEQ: 0
3142
3143                             ;*****************************************************************************************
3144                             ;
3145                             ;       THIS TEST VERIFIES ALL LEGAL MODES OF THE JSR INSTRUCTION.
3146                             ;THE CONCEPT OF LEAP FROGGING AND SEQUENCE CHECKING (JSRSEQ) IS
3147                             ;IDENTICAL TO THAT USED IN JMP TEST (SEE PREVIOUS TEST).  EACH
3148                             ;BLOCK OF CODE VERIFIES THE PREVIOUS JSR BY CHECKING THE SEQUENCE,
3149                             ;CHECKING THAT THE PC WAS SAVED IN THE SPECIFIED REGISTER, CHECKING
3150                             ;THAT THE SP WAS DECREMENTED, CHECKING THAT THE REGISTER WAS
3151                             ;SAVED ON THE STACK, AND FINALLY CHECKING THAT ANY MODE ADDRESS
3152                             ;REGISTER ALTERATIONS (E.G. INCREMENT REGISTER IN MODE 2) WERE
3153                             ;SUCCESSFUL.  R1 IS USED AS THE REGISTER IN ALL JSR INSTRUCTIONS.
3154                             ;       IF A FAILURE OCCURS, THE SEQUENCE CHECKER WILL ASSIST IN
3155                             ;DETERMINING JUST WHICH MODE FAILED.  IF THE SEQUENCE IS CORRECT
3156                             ;THEN THE ERROR DETECTED WAS A FUNCTIONAL FAILURE (E.G., INCORRECT
3157                             ;REGISTER SAVED).
3158                             ;
```

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3159                                    .SBTTL  TEST # 202 - TEST JSR INSTRUCTION W/ ALL MODES
                                        ;*****************************************************************************
                                        ;TEST 202 - TEST JSR INSTRUCTION W/ ALL MODES
                                        ;*****************************************************************************
     020554  005212                     TST202: INC     (R2)            ;UPDATE TEST NUMBER
     020556  022712  000202                     CMP     #202,(R2)       ;SEQUENCE ERROR?
     020562  001001                             BNE     JSR0            ;BR TO ERROR HALT ON SEQ ERROR
3160 020564  000402                             BR      JSR1
3161 020566  000137  021256             JSR0:   JMP     @#JSRCK1
3162
3163 020572  012706  001000             JSR1:   MOV     #STBOT,R6       ;SET STACK POINTER
3164 020576  012700  020714                     MOV     #JSR2,R0        ;SET TARGET ADDRESS
3165 020602  005037  021236                     CLR     @#JSRSEQ        ;INITIALIZE SEQUENCE CHECKER
3166 020606  005001                             CLR     R1              ;INITIALIZE R1
3167 020610  005101                             COM     R1
3168 020612  004110                             JSR     R1,(R0)         ;TRY JSR MODE 1
3169                                                                     ; TO SCOPE: REPLACE THE MOVE INSTRUCTION   <====
3170                                                                     ;           FOLLOWING W/ 774               <====
3171 020614                             JSR1A:
     020614  012762  000420  177776             MOV     #420,-2(R2)     ;MOVE TO MAILBOX #  *******  420  *******
     020622  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     020626  000000                             HALT                    ;JSR MODE 1 FAILED
3172
3173 020630  022737  000001  021236     JSR3:   CMP     #1,@# JSRSEQ    ;CHECK SEQUENCE: JSRSEQ=1?
3174 020636  001014                             BNE     JSR3A           ;BRANCH IF OUT OF SEQUENCE
3175 020640  020127  021002                     CMP     R1,#JSR4        ;PROPER PC SAVED?
3176 020644  001011                             BNE     JSR3A           ;BRANCH IF PC WRONG
3177 020646  022706  000776                     CMP     #STBOT-2,R6     ;STACK POINTER DECREMENTED?
3178 020652  001006                             BNE     JSR3A           ;BRANCH IF SP WRONG
3179 020654  022716  125252                     CMP     #125252,(R6)    ;REG SAVED ON STACK?
3180 020660  001003                             BNE     JSR3A           ;BRANCH IF REG. NOT SAVED
3181 020662  022700  020632                     CMP     #JSR3+2,R0      ;MODE 2 INCREMENT CORRECT?
3182 020666  001406                             BEQ     JSR3B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 735           <====
     020670                             JSR3A:
     020670  012762  000421  177776             MOV     #421,-2(R2)     ;MOVE TO MAILBOX #  *******  421  *******
     020676  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     020702  000000                             HALT                    ;JSR MODE 3 MALFUNCTIONED
3183 020704  005237  021236             JSR3B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
3184 020710  004137  021002                     JSR     R1,@#JSR4       ;TRY JSR MODE 4
3185
3186 020714  005737  021236             JSR2:   TST     @#JSRSEQ        ;CHECK SEQUENCE: JSRSEQ=0?
3187 020720  001011                             BNE     JSR2A           ;BRANCH IF OUT OF SEQUENCE
3188 020722  020127  020614                     CMP     R1,#JSR1A       ;PROPER PC SAVED?
3189 020726  001006                             BNE     JSR2A           ;BRANCH IF PC WRONG
3190 020730  022706  000776                     CMP     #STBOT-2,R6     ;R6 DECREMENT?
3191 020734  001003                             BNE     JSR2A           ;BRANCH IF R6 IS INCORRECT
3192 020736  021627  177777                     CMP     (R6),#-1        ;REGISTER SAVED?
3193 020742  001406                             BEQ     JSR2B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 707           <====
     020744                             JSR2A:
```

```
        020744  012762  000422  177776          MOV     #422,-2(R2)     ;MOVE TO MAILBOX #  *******  422  *******
        020752  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        020756  000000                          HALT                    ;JSR MODE 1 MALFUNCTIONED
  3194  020760  012706  001000          JSR2B:  MOV     #STBOT,R6       ;INITIALIZE R6
  3195  020764  012701  125252                  MOV     #125252,R1      ;INITIALIZE R1
  3196  020770  005237  021236                  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
  3197  020774  012700  020630                  MOV     #JSR3,R0        ;SET TARGET ADDRESS
  3198  021000  004120                          JSR     R1,(R0)+        ;TRY JSR MODE 2
  3199
  3200  021002  022737  000002  021236  JSR4:   CMP     #2,@#JSRSEQ     ;CHECK SEQUENCE: JSRSEQ=2?
  3201  021010  001003                          BNE     JSR4A           ;BRANCH IF OUT OF SEQUENCE
  3202  021012  022701  020714                  CMP     #JSR2,R1        ;PROPER PC SAVED?
  3203  021016  001406                          BEQ     JSR4B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 661           <====
        021020                          JSR4A:
        021020  012762  000423  177776          MOV     #423,-2(R2)     ;MOVE TO MAILBOX #  *******  423  *******
        021026  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        021032  000000                          HALT                    ;JSR MODE 3 MALFUNCTIONED
  3204  021034  005237  021236          JSR4B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
  3205  021040  012700  021120                  MOV     #JSR5+2,R0      ;SET TARGET ADDRESS
  3206  021044  004140                          JSR     R1,-(R0)        ;TRY JSR MODE 4
  3207
  3208  021046  022767  000004  000162  JSR6:   CMP     #4,JSRSEQ       ;CHECK SEQUENCE: JSRSEQ=4?
  3209  021054  001006                          BNE     JSR6A           ;BRANCH IF OUT OF SEQUENCE
  3210  021056  022701  021170                  CMP     #JSR7,R1        ;PROPER PC SAVED?
  3211  021062  001003                          BNE     JSR6A           ;BRANCH IF PC WRONG
  3212  021064  022700  021232                  CMP     #JSR6AD,R0      ;MODE 5 REGISTER CORRECT?
  3213  021070  001406                          BEQ     JSR6B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 634           <====
        021072                          JSR6A:
        021072  012762  000424  177776          MOV     #424,-2(R2)     ;MOVE TO MAILBOX #  *******  424  *******
        021100  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        021104  000000                          HALT                    ;JSR MODE 5 FAILED
  3214  021106  005237  021236          JSR6B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
  3215  021112  004167  000052                  JSR     R1,JSR7         ;TRY JSR MODE 6
  3216  021116  022767  000003  000112  JSR5:   CMP     #3,JSRSEQ       ;CHECK SEQUENCE: JSRSEQ=3?
  3217  021124  001006                          BNE     JSR5A           ;BRANCH IF OUT OF SEQUENCE
  3218  021126  022701  021046                  CMP     #JSR6,R1        ;PROPER PC SAVED?
  3219  021132  001003                          BNE     JSR5A           ;BRANCH IF PC WRONG
  3220  021134  022700  021116                  CMP     #JSR5,R0        ;CHECK MODE 4 REGISTER
  3221  021140  001406                          BEQ     JSR5B
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 610           <====
        021142                          JSR5A:
        021142  012762  000425  177776          MOV     #425,-2(R2)     ;MOVE TO MAILBOX #  *******  425  *******
        021150  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        021154  000000                          HALT                    ;JSR MODE 4 MALFUNCTIONED
  3222  021156  005237  021236          JSR5B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
  3223  021162  012700  021234                  MOV     #JSR6AD+2,R0    ;POINT R0 TO TARGET ADDRESS
```

```
3224 021166  004150                          JSR     R1,@-(R0)       ;TRY JSR MODE 5
3225
3226 021170  022737  000005  021236  JSR7:   CMP     #5,@#JSRSEQ     ;CHECK SEQUENCE: JSRSEQ=5?
3227 021176  001003                          BNE     JSR7A           ;BRANCH IF OUT OF SEQUENCE
3228 021200  022701  021116                  CMP     #JSR5,R1        ;PROPER PC SAVED?
3229 021204  001406                          BEQ     JSR7B
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                     ;           CONDITIONAL BRANCH INST. AND   <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                     ;           WHICH FOLLOWS W/ 566           <====
     021206                               JSR7A:
     021206  012762  000426  177776          MOV     #426,-2(R2)     ;MOVE TO MAILBOX #  *******  426  *******
     021214  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     021220  000000                          HALT                    ;JSR MODE 6 FAILED
3230 021222  005237  021236          JSR7B:  INC     @#JSRSEQ        ;UPDATE SEQUENCE CHECKER
3231 021226  004177  000002                  JSR     R1,@JSRCKAD     ;TRY JSR MODE 7
3232
3233 021232  021046                  JSR6AD: JSR6                    ;MODE 5 TARGET ADDRESS
3234 021234  021240                  JSRCKAD:JSRCK                   ;MODE 7 TARGET ADDRESS
3235 021236  000000                  JSRSEQ: 0                       ;SEQUENCE CHECKER
3236
3237 021240  022767  000006  177770  JSRCK:  CMP     #6,JSRSEQ       ;CHECK SEQUENCE: JSRSEQ=6?
3238 021246  001003                          BNE     JSRCK1          ;BRANCH IF OUT OF SEQUENCE
3239 021250  022701  021232                  CMP     #JSR6AD,R1      ;PROPER PC SAVED?
3240 021254  001406                          BEQ     TST203
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                     ;           CONDITIONAL BRANCH INST. AND   <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                     ;           WHICH FOLLOWS W/ 542           <====
     021256                               JSRCK1:
     021256  012762  000427  177776          MOV     #427,-2(R2)     ;MOVE TO MAILBOX #  *******  427  *******
     021264  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     021270  000000                          HALT                    ;JSR MODE 7 MALFUNCTIONED
                                                                     ;  OR SEQUENCE ERROR
3241
3242
3243                                 ;*************************************************************************************
3244                                 ;
3245                                 ;       THIS TEST VERIFIES THE RTS INSTRUCTION.  THE STACK POINTER
3246                                 ;IS INITIALIZED AND A TEST PATTERN STORED ON STACK.  R0 IS LOADED
3247                                 ;WITH RETURN ADDRESS.  AN RTS IS EXECUTED, AND, AT THE TARGET
3248                                 ;ADDRESS, A CHECK IS MADE THAT R0 WAS PROPERLY RESTORED FROM THE
3249                                 ;STACK.
```

```
3250                                    .SBTTL  TEST # 203 - TEST RTS INSTRUCTION
                                        ;*************************************************************************
                                        ;TEST 203 - TEST RTS INSTRUCTION
                                        ;*************************************************************************
                                        ;
        021272  005212                  TST203: INC     (R2)            ;UPDATE TEST NUMBER
        021274  022712  000203                  CMP     #203,(R2)       ;SEQUENCE ERROR?
        021300  001022                          BNE     TST204-10       ;BR TO ERROR HALT ON SEQ ERROR
3251    021302  012706  001000                  MOV     #STBOT,R6       ;INITIALIZE STACK POINTER
3252    021306  012746  052525                  MOV     #52525,-(R6)    ;INITIALIZE TOP OF STACK
3253    021312  012700  021334                  MOV     #RTS1,R0        ;INITIALIZE RETURN REGISTER
3254    021316  000200                          RTS     R0              ;TRY RTS THROUGH R0
3255                                                                    ; TO SCOPE: REPLACE THE MOVE INSTRUCTION   <====
3256                                                                    ;           FOLLOWING W/ 770               <====
3257    021320  012762  000430  177776          MOV     #430,-2(R2)     ;MOVE TO MAILBOX #  *******  430  *******
        021326  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        021332  000000                          HALT                    ;RTS FAILED
3258    021334  022700  052525          RTS1:   CMP     #52525,R0       ;CHECK THAT R0 RESTORED FROM STACK
3259    021340  001406                          BEQ     TST204
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 757           <====
        021342  012762  000431  177776          MOV     #431,-2(R2)     ;MOVE TO MAILBOX #  *******  431  *******
        021350  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        021354  000000                          HALT                    ;RTS MALFUNCTIONED
                                                                        ;  OR SEQUENCE ERROR
3260                                    ;*************************************************************************
```

```
3262                                    ;
3263                                    ;       THESE NEXT FOUR TESTS VERIFY THE FUNCTIONING OF A GROUP
3264                                    ;OF FOUR INSTRUCTIONS.  THE GROUP CONSISTS OF THE INSTRUCTIONS:
3265                                    ;MOV, BIC, BIT, AND BIS.  THESE INSTRUCTIONS ARE SIMILAR IN THE
3266                                    ;WAY THEY EFFECT THE C AND V BITS.  THEY ALL LEAVE THE V-BIT
3267                                    ;CLEAR AND THE C-BIT UNAFFECTED.
3268                                    ;       THE TEST PROCEDURE IS AS FOLLOWS:  THE N, Z, AND V BITS
3269                                    ;ARE LOADED WITH THE COMPLEMENT OF THE EXPECTED RESULTS, THE C-BIT
3270                                    ;IS LOADED WITH THE DESIRED RESULT.  THE INSTRUCTION IS EXECUTED
3271                                    ;WITH DIFFERENT DATA PATTERNS AND THE RESULTS ARE VERIFIED WITH
3272                                    ;A SERIES OF CONDITIONAL BRANCH INSTRUCTIONS.  THE DATA IS CHOSEN
3273                                    ;TO PRODUCT ALL POSSIBLE COMBINATIONS OF THE C AND V BITS.
3274                                    ;
```

```
3275                                    .SBTTL  TEST # 204 - TEST MOV INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 204 - TEST MOV INSTRUCTION
                                        ;*****************************************************************************
021356  005212                TST204: INC     (R2)            ;UPDATE TEST NUMBER
021360  022712  000204                CMP     #204,(R2)       ;SEQUENCE ERROR?
021364  001026                        BNE     TST205-10       ;BR TO ERROR HALT ON SEQ ERROR
3276 021366  000277                   SCC                     ;CC=0110
3277 021370  000251                   +CLN!CLC
3278 021372  012700  100000           MOV     #100000,R0      ;CC=1000
3279 021376  101402                   BLOS    MOV1
3280 021400  102401                   BVS     MOV1
3281 021402  100406                   BMI     MOV2
                                                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                               ;           CONDITIONAL BRANCH INST. AND   <====
                                                               ;           REPLACE THE MOVE INSTRUCTION   <====
                                                               ;           WHICH FOLLOWS W/ 770           <====
021404                          MOV1:
021404  012762  000432  177776        MOV     #432,-2(R2)     ;MOVE TO MAILBOX #  *******  432  *******
021412  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
021416  000000                        HALT                    ;MOV DID NOT SET CC'S CORRECTLY
3282
3283 021420  000277           MOV2:   SCC                     ;CC=1011
3284 021422  000244                   CLZ
3285 021424  012700  000000           MOV     #0,R0           ;CC=0101
3286 021430  101002                   BHI     MOV3            ;C OR Z = 0?
3287 021432  102401                   BVS     MOV3            ;V=1?
3288 021434  100006                   BPL     TST205
                                                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                               ;           CONDITIONAL BRANCH INST. AND   <====
                                                               ;           REPLACE THE MOVE INSTRUCTION   <====
                                                               ;           WHICH FOLLOWS W/ 753           <====
021436                          MOV3:
021436  012762  000433  177776        MOV     #433,-2(R2)     ;MOVE TO MAILBOX #  *******  433  *******
021444  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
021450  000000                        HALT                    ;MOV DID NOT SET CC'S CORRECTLY
                                                               ;  OR SEQUENCE ERROR
```

```
3289                                    .SBTTL  TEST # 205 - TEST BIT INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 205 - TEST BIT INSTRUCTION
                                        ;*****************************************************************************
                                        ;
        021452  005212                  TST205: INC     (R2)            ;UPDATE TEST NUMBER
        021454  022712  000205                  CMP     #205,(R2)       ;SEQUENCE ERROR?
        021460  001030                          BNE     TST206-10       ;BR TO ERROR HALT ON SEQ ERROR
3290    021462  012700  100001                  MOV     #100001,R0
3291    021466  000277                          SCC                     ;CC=0110
3292    021470  000251                          +CLN!CLC
3293    021472  032700  100000                  BIT     #100000,R0      ;CC=1000
3294    021476  101402                          BLOS    XBIT1
3295    021500  102401                          BVS     XBIT1
3296    021502  100406                          BMI     XBIT2
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 766           <====
        021504                          XBIT1:
        021504  012762  000434  177776          MOV     #434,-2(R2)     ;MOVE TO MAILBOX #  *******  434  *******
        021512  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        021516  000000                          HALT                    ;BIT DID NOT SET CC'S CORRECTLY
3297
3298    021520  000277                  XBIT2:  SCC                     ;CC=1011
3299    021522  000244                          CLZ
3300    021524  032700  077776                  BIT     #77776,R0       ;CC=0101
3301    021530  101002                          BHI     XBIT3
3302    021532  102401                          BVS     XBIT3
3303    021534  100006                          BPL     TST206
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 751           <====
        021536                          XBIT3:
        021536  012762  000435  177776          MOV     #435,-2(R2)     ;MOVE TO MAILBOX #  *******  435  *******
        021544  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        021550  000000                          HALT                    ;BIT DID NOT SET CC'S CORRECTLY
                                                                        ;  OR SEQUENCE ERROR
```

```
3304                                    .SBTTL  TEST # 206 - TEST BIC INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 206 - TEST BIC INSTRUCTION
                                        ;*****************************************************************************
021552  005212                  TST206: INC     (R2)            ;UPDATE TEST NUMBER
021554  022712  000206                  CMP     #206,(R2)       ;SEQUENCE ERROR?
021560  001030                          BNE     TST207-10       ;BR TO ERROR HALT ON SEQ ERROR
3305 021562  012700  177777            MOV     #177777,R0
3306 021566  000277                    SCC                     ;CC=0110
3307 021570  000251                    +CLN!CLC
3308 021572  042700  077777            BIC     #77777,R0       ;CC=1000
3309 021576  101402                    BLOS    BIC1
3310 021600  102401                    BVS     BIC1
3311 021602  100406                    BMI     BIC2
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 766           <====
021604                          BIC1:
021604  012762  000436  177776        MOV     #436,-2(R2)     ;MOVE TO MAILBOX #  *******  436  *******
021612  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
021616  000000                        HALT                    ;BIC DID NOT SET CC'S CORRECTLY
3312 021620  000277             BIC2:  SCC                     ;CC=1011
3313 021622  000244                    CLZ
3314 021624  042700  100000            BIC     #100000,R0      ;CC=0101
3315 021630  101002                    BHI     BIC3
3316 021632  102401                    BVS     BIC3
3317 021634  100006                    BPL     TST207
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 751           <====
021636                          BIC3:
021636  012762  000437  177776        MOV     #437,-2(R2)     ;MOVE TO MAILBOX #  *******  437  *******
021644  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
021650  000000                        HALT                    ;BIC DID NOT SET CC'S CORRECTLY
                                                                ;  OR SEQUENCE ERROR
```

```
3318                                    .SBTTL  TEST # 207 - TEST BIS INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 207 - TEST BIS INSTRUCTION
                                        ;*****************************************************************************
     021652  005212                   TST207: INC     (R2)            ;UPDATE TEST NUMBER
     021654  022712  000207                   CMP     #207,(R2)       ;SEQUENCE ERROR?
     021660  001031                           BNE     TST210-10       ;BR TO ERROR HALT ON SEQ ERROR
3319 021662  005000                           CLR     R0              ;R0=0
3320 021664  000277                           SCC                     ;CC=1010
3321 021666  000251                           +CLN!CLC
3322 021670  052700  000000                   BIS     #0,R0           ;CC=0100  R0=0
3323 021674  103403                           BCS     BIS1
3324 021676  102402                           BVS     BIS1
3325 021700  100401                           BMI     BIS1
3326 021702  001406                           BEQ     BIS2
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 766           <====
     021704                             BIS1:
     021704  012762  000440  177776            MOV     #440,-2(R2)     ;MOVE TO MAILBOX #  *******  440  *******
     021712  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     021716  000000                            HALT                    ;BIS DID NOT SET CC'S CORRECTLY
3327 021720  000277                    BIS2:   SCC                     ;CC=0111
3328 021722  000250                            CLN
3329 021724  052700  177777                    BIS     #177777,R0      ;CC=1001
3330 021730  103003                            BCC     BIS3
3331 021732  102402                            BVS     BIS3
3332 021734  001401                            BEQ     BIS3
3333 021736  100406                            BMI     TST210
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 750           <====
     021740                             BIS3:
     021740  012762  000441  177776            MOV     #441,-2(R2)     ;MOVE TO MAILBOX #  *******  441  *******
     021746  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     021752  000000                            HALT                    ;BIS DID NOT SET CC'S CORRECTLY
                                                                       ;  OR SEQUENCE ERROR
3334
3335                                    ;*****************************************************************************
3336                                    ;
3337                                    ;       THESE NEXT TWO TESTS VERIFY THE FUNCTIONING OF THE INC AND
3338                                    ;DEC INSTRUCTIONS.  THESE INSTRUCTIONS BOTH EFFECT THE C AND V
3339                                    ;BITS THE SAME; THE C-BIT IS LEFT UNCHANGED AND THE V-BIT IS DEPENDENT
3340                                    ;UPON THE DATA RESULTS.  THE SAME PROCEDURE IS USED.  THE CONDITION
3341                                    ;CODE BITS ARE INITIALIZED, THE INSTRUCTION IS EXECUTED AND THE
3342                                    ;RESULTS ARE VERIFIED WITH A SERIES OF CONDITIONAL BRANCH INSTRUCTIONS.
3343                                    ;THIS PROCEDURE IS REPEATED WITH SEVERAL DATA PATTERNS TO PRODUCE
3344                                    ;DIFFERENT COMBINATIONS OF THE C AND V BITS.
3345                                    ;
```

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3346                                    .SBTTL  TEST # 210 - TEST INC INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 210 - TEST INC INSTRUCTION
                                        ;*****************************************************************************
     021754  005212                     TST210: INC     (R2)            ;UPDATE TEST NUMBER
     021756  022712  000210                     CMP     #210,(R2)       ;SEQUENCE ERROR?
     021762  001045                             BNE     TST211-10       ;BR TO ERROR HALT ON SEQ ERROR
3347 021764  012700  077777                     MOV     #077777,R0      ;R0=077777
3348 021770  000257                             CCC                     ;CC=0100
3349 021772  000264                             SEZ
3350 021774  005200                             INC     R0              ;CC=1010   R0=10000
3351 021776  101402                             BLOS    INC1
3352 022000  100001                             BPL     INC1
3353 022002  102406                             BVS     INC2
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 767           <====
     022004                             INC1:
     022004  012762  000442  177776             MOV     #442,-2(R2)     ;MOVE TO MAILBOX #  *******  442  *******
     022012  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     022016  000000                             HALT                    ;INC DID NOT SET CC'S CORRECTLY
3354 022020  052700  077777             INC2:   BIS     #77777,R0       ;R0=177777
3355 022024  000261                             SEC                     ;CC=1011
3356 022026  000244                             CLZ
3357 022030  005200                             INC     R0              ;CC=0101   R0=0
3358 022032  100403                             BMI     INC3
3359 022034  102402                             BVS     INC3
3360 022036  103001                             BCC     INC3
3361 022040  001406                             BEQ     INC4
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 750           <====
     022042                             INC3:
     022042  012762  000443  177776             MOV     #443,-2(R2)     ;MOVE TO MAILBOX #  *******  443  *******
     022050  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     022054  000000                             HALT                    ;INC DID NOT SET CC'S CORRECTLY
3362
3363 022056  000277                     INC4:   SCC                     ;CC=1110
3364 022060  000241                             CLC
3365 022062  005200                             INC     R0              ;CC=0000   R0=1
3366 022064  101402                             BLOS    INC5
3367 022066  100401                             BMI     INC5
3368 022070  100006                             BPL     TST211
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 734           <====
     022072                             INC5:
     022072  012762  000444  177776             MOV     #444,-2(R2)     ;MOVE TO MAILBOX #  *******  444  *******
     022100  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     022104  000000                             HALT                    ;INC DID NOT SET CC'S CORRECTLY
                                                                        ;  OR SEQUENCE ERROR
3369
```

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3370                                    .SBTTL  TEST # 211 - TEST DEC INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 211 - TEST DEC INSTRUCTION
                                        ;*****************************************************************************
 022106  005212                       TST211: INC     (R2)            ;UPDATE TEST NUMBER
 022110  022712  000211                       CMP     #211,(R2)       ;SEQUENCE ERROR?
 022114  001061                             BNE     TST212-10       ;BR TO ERROR HALT ON SEQ ERROR
3371 022116  012700  000002                 MOV     #2,R0           ;R0=2
3372 022122  000277                         SCC                     ;CC=1111
3373 022124  005300                         DEC     R0              ;CC=0001   R0=1
3374 022126  100403                         BMI     DEC1
3375 022130  001402                         BEQ     DEC1
3376 022132  102401                         BVS     DEC1
3377 022134  103406                         BCS     DEC2
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 767           <====
 022136                                 DEC1:
 022136  012762  000445  177776             MOV     #445,-2(R2)     ;MOVE TO MAILBOX #  *******  445  *******
 022144  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 022150  000000                             HALT                    ;DEC DID NOT SET CC'S CORRECTLY
3378 022152  000261                     DEC2:   SEC                     ;CC=1011
3379 022154  000244                             CLZ
3380 022156  005300                             DEC     R0              ;CC=0101   R0=0
3381 022160  101002                             BHI     DEC3
3382 022162  100401                             BMI     DEC3
3383 022164  102006                             BVC     DEC4
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 753           <====
 022166                                 DEC3:
 022166  012762  000446  177776             MOV     #446,-2(R2)     ;MOVE TO MAILBOX #  *******  446  *******
 022174  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 022200  000000                             HALT                    ;DEC DID NOT SET CC'S CORRECTLY
3384 022202  000277                     DEC4:   SCC                     ;CC=0110
3385 022204  000251                             +CLN!CLC
3386 022206  005300                             DEC     R0              ;CC=1000   R0=177777
3387 022210  101402                             BLOS    DEC5
3388 022212  102401                             BVS     DEC5
3389 022214  100406                             BMI     DEC6
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 737           <====
 022216                                 DEC5:
 022216  012762  000447  177776             MOV     #447,-2(R2)     ;MOVE TO MAILBOX #  *******  447  *******
 022224  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 022230  000000                             HALT                    ;DEC DID NOT SET CC'S CORRECTLY
3390 022232  042700  077777             DEC6:   BIC     #77777,R0       ;R0=100000
3391 022236  000277                             SCC                     ;CC=0101
3392 022240  000252                             +CLN!CLV
3393 022242  005300                             DEC     R0              ;CC=1011   R0=77777
3394 022244  100403                             BMI     DEC7            ;CC=0011
3395 022246  001402                             BEQ     DEC7
3396 022250  102001                             BVC     DEC7
```

```
3397 022252  103406                    BCS     TST212
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 720           <====
     022254                             DEC7:
     022254  012762  000450  177776             MOV     #450,-2(R2)     ;MOVE TO MAILBOX #  *******  450  *******
     022262  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     022266  000000                             HALT                    ;DEC DID NOT SET CC'S CORRECTLY
                                                                         ;  OR SEQUENCE ERROR
3398
3399
3400                                ;*************************************************************************************
3401                                ;
3402                                ;       THESE NEXT THREE TESTS VERIFY THE FUNCTIONING OF THE CLR,
3403                                ;TST, AND SWAB INSTRUCTIONS.  THESE THREE INSTRUCTIONS ALL LEAVE
3404                                ;THE C AND V BITS CLEARED.  AGAIN, THE CONDITION CODES ARE PRESET,
3405                                ;THE INSTRUCTION EXECUTED AND THE RESULTS CHECKED WITH CONDITIONAL
3406                                ;BRANCH INSTRUCTIONS.  THE PROCEDURE IS REPEATED TO PRODUCE OTHER
3407                                ;COMBINATIONS OF CONDITION CODES.
3408                                ;
```

```
3409                                    .SBTTL  TEST # 212 - TEST CLR INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 212 - TEST CLR INSTRUCTION
                                        ;*****************************************************************************
     022270  005212                     TST212: INC     (R2)            ;UPDATE TEST NUMBER
     022272  022712  000212                     CMP     #212,(R2)       ;SEQUENCE ERROR?
     022276  001011                             BNE     TST213-10       ;BR TO ERROR HALT ON SEQ ERROR
3410 022300  000277                             SCC                     ;CC=1011
3411 022302  000244                             CLZ
3412 022304  005000                             CLR     R0              ;CC=0100   R0=0
3413 022306  100403                             BMI     CLR1
3414 022310  102402                             BVS     CLR1
3415 022312  103401                             BCS     CLR1
3416 022314  001406                             BEQ     TST213
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 770           <====
     022316                             CLR1:
     022316  012762  000451  177776             MOV     #451,-2(R2)     ;MOVE TO MAILBOX #  *******  451  *******
     022324  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     022330  000000                             HALT                    ;CLR DID NOT SET CC'S CORRECTLY
                                                                         ;  OR SEQUENCE ERROR
3417
```

TEST # 213 - TEST TST INSTRUCTION

```
3418                                    .SBTTL  TEST # 213 - TEST TST INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 213 - TEST TST INSTRUCTION
                                        ;*****************************************************************************
     022332  005212                     TST213: INC     (R2)            ;UPDATE TEST NUMBER
     022334  022712  000213                     CMP     #213,(R2)       ;SEQUENCE ERROR?
     022340  001026                             BNE     TST214-10       ;BR TO ERROR HALT ON SEQ ERROR
3419 022342  000277                             SCC                     ;CC=1011
3420 022344  000244                             CLZ
3421 022346  005700                             TST     R0              ;CC=0100
3422 022350  100403                             BMI     TEST1
3423 022352  102402                             BVS     TEST1
3424 022354  103401                             BCS     TEST1
3425 022356  001406                             BEQ     TEST2
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 770           <====
     022360                             TEST1:
     022360  012762  000452  177776              MOV     #452,-2(R2)     ;MOVE TO MAILBOX #  *******  452  *******
     022366  005262  177774                      INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     022372  000000                              HALT                    ;TEST DID NOT SET CC'S CORRECTLY
3426 022374  005300                     TEST2:  DEC     R0              ;MAKE R0 NEGATIVE
3427 022376  000277                             SCC                     ;CC=0111
3428 022400  000250                             CLN
3429 022402  005700                             TST     R0              ;CC=1000
3430 022404  101402                             BLOS    TEST3
3431 022406  102401                             BVS     TEST3
3432 022410  100406                             BMI     TST214
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 753           <====
022412                                  TEST3:
022412  012762  000453  177776              MOV     #453,-2(R2)     ;MOVE TO MAILBOX #  *******  453  *******
022420  005262  177774                      INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
022424  000000                              HALT                    ;TEST DID NOT SET CC'S CORRECTLY
                                                                    ;  OR SEQUENCE ERROR
```

```
3433                                    .SBTTL  TEST # 214 - TEST SWAB INSTRUCTION
                                        ;*************************************************************************
                                        ;TEST 214 - TEST SWAB INSTRUCTION
                                        ;*************************************************************************
 022426  005212                        TST214: INC     (R2)            ;UPDATE TEST NUMBER
 022430  022712  000214                        CMP     #214,(R2)       ;SEQUENCE ERROR?
 022434  001027                                BNE     TST215-10       ;BR TO ERROR HALT ON SEQ ERROR
3434 022436  012700  170000                    MOV     #170000,R0      ;R0=170000
3435 022442  000277                            SCC                     ;CC=0111
3436 022444  000250                            CLN
3437 022446  000300                            SWAB    R0              ;CC=1000   R0=360
3438 022450  101402                            BLOS    SWB1
3439 022452  102401                            BVS     SWB1
3440 022454  100406                            BMI     SWB2
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 767           <====
 022456                                 SWB1:
 022456  012762  000454  177776                MOV     #454,-2(R2)     ;MOVE TO MAILBOX #  *******  454  *******
 022464  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 022470  000000                                HALT                    ;SWAB DID NOT SET CC'S CORRECTLY
3441 022472  000277                    SWB2:   SCC                     ;CC=1011
3442 022474  000244                            CLZ
3443 022476  000300                            SWAB    R0              ;CC=0100   R0=170000
3444 022500  102403                            BVS     SWB3
3445 022502  103402                            BCS     SWB3
3446 022504  100401                            BMI     SWB3
3447 022506  001406                            BEQ     TST215
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 752           <====
 022510                                 SWB3:
 022510  012762  000455  177776                MOV     #455,-2(R2)     ;MOVE TO MAILBOX #  *******  455  *******
 022516  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 022522  000000                                HALT                    ;
3448
3449                                    ;*************************************************************************
3450                                    ;
3451                                    ;       THESE NEXT TWO TESTS VERIFY THE FUNCTIONING OF THE ADD AND
3452                                    ;ADC INSTRUCTIONS.  BOTH OF THESE INSTRUCTIONS HANDLE THE C AND
3453                                    ;V BITS IDENTICALLY.  THE PROCEDURE IS TO PRESET THE CONDITION
3454                                    ;CODES, EXECUTE THE INSTRUCTION WITH A PARTICULAR SET OF DATA, AND
3455                                    ;THEN CHECK THE RESULTS BY EXECUTING A SERIES OF CONDITIONAL
3456                                    ;BRANCHES.  THES PROCEDURE IS REPEATED SEVERAL TIMES WITH DIFFERENT
3457                                    ;DATA TO PRODUCE EVERY COMBINATION OF C AND V BITS.
3458                                    ;
```

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3459                                    .SBTTL  TEST # 215 - TEST ADD INSTRUCTION
                                        ;******************************************************************************
                                        ;TEST 215 - TEST ADD INSTRUCTION
                                        ;******************************************************************************
        022524  005212                  TST215: INC     (R2)            ;UPDATE TEST NUMBER
        022526  022712  000215                  CMP     #215,(R2)       ;SEQUENCE ERROR?
        022532  001074                          BNE     TST216-10       ;BR TO ERROR HALT ON SEQ ERROR
3460    022534  012700  040000                  MOV     #40000,R0       ;R0=40000
3461    022540  000277                          SCC                     ;CC=1111
3462    022542  062700  030000                  ADD     #30000,R0       ;CC=0000   R0=70000
3463    022546  101402                          BLOS    ADD1
3464    022550  102401                          BVS     ADD1
3465    022552  100006                          BPL     ADD2
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 767           <====
        022554                          ADD1:
        022554  012762  000456  177776          MOV     #456,-2(R2)     ;MOVE TO MAILBOX #  *******  456  *******
        022562  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        022566  000000                          HALT                    ;ADD DID NOT SET CC'S CORRECTLY
3466    022570  000264                  ADD2:   SEZ                     ;CC=0100
3467
3468    022572  062700  010000                  ADD     #10000,R0       ;CC=1010   40=100000
3469    022576  101402                          BLOS    ADD3
3470    022600  102001                          BVC     ADD3
3471    022602  100406                          BMI     ADD4
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 753           <====
        022604                          ADD3:
        022604  012762  000457  177776          MOV     #457,-2(R2)     ;MOVE TO MAILBOX #  *******  457  *******
        022612  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        022616  000000                          HALT                    ;ADD DID NOT SET CC'S CORRECTLY
3472    022620  000257                  ADD4:   CCC                     ;CC=1000
3473    022622  000270                          SEN
3474    022624  062700  100000                  ADD     #100000,R0      ;CC=0111   R0=0
3475    022630  101002                          BHI     ADD5
3476    022632  102001                          BVC     ADD5
3477    022634  100006                          BPL     ADD6
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 736           <====
        022636                          ADD5:
        022636  012762  000460  177776          MOV     #460,-2(R2)     ;MOVE TO MAILBOX #  *******  460  *******
        022644  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        022650  000000                          HALT                    ;ADD DID NOT SET CC'S CORRECTLY
3478    022652  062700  177777          ADD6:   ADD     #177777,R0      ;CC=1000   R0=177777
3479    022656  101402                          BLOS    ADD7
3480    022660  102401                          BVS     ADD7
3481    022662  100406                          BMI     ADD8
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 723           <====
```

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        022664                                  ADD7:
        022664  012762  000461  177776                MOV     #461,-2(R2)     ;MOVE TO MAILBOX #  *******  461  *******
        022672  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        022676  000000                                HALT                    ;ADD DID NOT SET CC'S CORRECTLY
  3482  022700  000277                          ADD8: SCC                     ;CC=1010
  3483  022702  000245                                +CLC!CLZ
  3484  022704  062700  000001                        ADD     #1,R0           ;CC=0101   R=0
  3485  022710  102403                                BVS     ADD9
  3486  022712  103002                                BCC     ADD9
  3487  022714  100401                                BMI     ADD9
  3488  022716  001406                                BEQ     TST216
                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                      ;           WHICH FOLLOWS W/ 705           <====
        022720                                  ADD9:
        022720  012762  000462  177776                MOV     #462,-2(R2)     ;MOVE TO MAILBOX #  *******  462  *******
        022726  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        022732  000000                                HALT                    ;ADD DID NOT SET CC'S CORRECTLY
                                                      ;  OR SEQUENCE ERROR

  3489
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                                .SBTTL  TEST # 216 - TEST ADC INSTRUCTION
                                ;*****************************************************************************
                                ;TEST 216 - TEST ADC INSTRUCTION
                                ;*****************************************************************************
                                ;
022734  005212                  TST216: INC     (R2)            ;UPDATE TEST NUMBER
022736  022712  000216                  CMP     #216,(R2)       ;SEQUENCE ERROR?
022742  001045                          BNE     TST217-10       ;BR TO ERROR HALT ON SEQ ERROR
3491 022744  012700  077777            MOV     #077777,R0
3492 022750  000277                    SCC                     ;CC=0101
3493 022752  000252                    +CLN!CLV
3494 022754  005500                    ADC     R0              ;CC=1010
3495 022756  101402                    BLOS    ADC1
3496 022760  102001                    BVC     ADC1
3497 022762  100406                    BMI     ADC2
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 767           <====
022764                          ADC1:
022764  012762  000463  177776          MOV     #463,-2(R2)     ;MOVE TO MAILBOX #  *******  463  *******
022772  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
022776  000000                          HALT                    ;ADC DID NOT SET CC'S CORRECTLY
3498 023000  052700  077777    ADC2:   BIS     #77777,R0
3499 023004  000277                    SCC                     ;CC=1011
3500 023006  000244                    CLZ
3501 023010  005500                    ADC     R0              ;CC=0101   R0=0
3502 023012  101002                    BHI     ADC3
3503 023014  102401                    BVS     ADC3
3504 023016  100006                    BPL     ADC4
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 751           <====
023020                          ADC3:
023020  012762  000464  177776          MOV     #464,-2(R2)     ;MOVE TO MAILBOX #  *******  464  *******
023026  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
023032  000000                          HALT                    ;ADC DID NOT SET CC'S CORRECTLY
3505 023034  000277            ADC4:   SCC
3506 023036  000245                    +CLZ!CLC                        ;CC=1010
3507 023040  005500                    ADC     R0              ;CC=0100
3508 023042  102403                    BVS     ADC5
3509 023044  103402                    BCS     ADC5
3510 023046  100401                    BMI     ADC5
3511 023050  001406                    BEQ     TST217
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 734           <====
023052                          ADC5:
023052  012762  000465  177776          MOV     #465,-2(R2)     ;MOVE TO MAILBOX #  *******  465  *******
023060  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
023064  000000                          HALT                    ;ADC DID NOT SET CC'S CORRECTLY
                                                                ;  OR SEQUENCE ERROR
3512
3513                            ;*****************************************************************************
3514                            ;
3515                            ;       THESE NEXT THREE TESTS VERIFY THE FUNCTIONING OF THE NEG.
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3516                    ;CMP, AND COM INSTRUCTIONS.  EACH OF THESE INSTRUCTIONS GENERATE
3517                    ;THE C AND V BITS IDENTICALLY.  THE CONDITION CODES ARE PRESET,
3518                    ;THE INSTRUCTIONS EXECUTED, AND THE RESULTS CHECKED WITH A SERIES
3519                    ;OF CONDITIONAL BRANCH INSTRUCTIONS.  THIS PROCEDURE IS REPEATED
3520                    ;SEVERAL TIMES WITH DIFFERENT DATA IN ORDER TO GENERATE DIFFERENT
3521                    ;COMBINATIONS OF THE C AND V BITS.
3522                    ;
```

```
3523                                    .SBTTL  TEST # 217 - TEST NEG INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 217 - TEST NEG INSTRUCTION
                                        ;*****************************************************************************
023066  005212                          TST217: INC     (R2)            ;UPDATE TEST NUMBER
023070  022712  000217                          CMP     #217,(R2)       ;SEQUENCE ERROR?
023074  001050                                  BNE     TST220-10       ;BR TO ERROR HALT ON SEQ ERROR
3524 023076  012700  000001                    MOV     #1,R0
3525 023102  000277                            SCC                     ;CC=0110
3526 023104  000251                            +CLN!CLC
3527 023106  005400                            NEG     R0              ;CC=1001   R0=177777
3528 023110  103003                            BCC     NEG1
3529 023112  102402                            BVS     NEG1
3530 023114  001401                            BEQ     NEG1
3531 023116  100406                            BMI     NEG2
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 766           <====
023120                                  NEG1:
023120  012762  000466  177776                MOV     #466,-2(R2)     ;MOVE TO MAILBOX #  *******  466  *******
023126  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
023132  000000                                HALT                    ;NEG DID NOT SET CC'S CORRECTLY
3532 023134  042700  077777            NEG2:  BIC     #77777,R0
3533 023140  000257                            CCC                     ;CC=0100
3534 023142  000264                            SEZ
3535 023144  005400                            NEG     R0              ;CC=1011   R0=100000
3536 023146  102003                            BVC     NEG3
3537 023150  103002                            BCC     NEG3
3538 023152  001401                            BEQ     NEG3
3539 023154  100406                            BMI     NEG4
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 747           <====
023156                                  NEG3:
023156  012762  000467  177776                MOV     #467,-2(R2)     ;MOVE TO MAILBOX #  *******  467  *******
023164  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
023170  000000                                HALT                    ;NEG DID NOT SET CC'S CORRECTLY
3540 023172  005000                    NEG4:  CLR     R0
3541 023174  000277                            SCC                     ;CC=1011
3542 023176  000244                            CLZ
3543 023200  005400                            NEG     R0              ;CC=0100   R0=0
3544 023202  102403                            BVS     NEG5
3545 023204  103402                            BCS     NEG5
3546 023206  001001                            BNE     NEG5
3547 023210  100006                            BPL     TST220
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 731           <====
023212                                  NEG5:
023212  012762  000470  177776                MOV     #470,-2(R2)     ;MOVE TO MAILBOX #  *******  470  *******
023220  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
023224  000000                                HALT                    ;NEG DID NOT SET CC'S CORRECTLY
                                                                        ;  OR SEQUENCE ERROR
3548
```

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3549                                    .SBTTL  TEST # 220 - TEST CMP INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 220 - TEST CMP INSTRUCTION
                                        ;*****************************************************************************
      023226  005212                    TST220: INC     (R2)            ;UPDATE TEST NUMBER
      023230  022712  000220                    CMP     #220,(R2)       ;SEQUENCE ERROR?
      023234  001070                            BNE     TST221-10       ;BR TO ERROR HALT ON SEQ ERROR
3550  023236  012700  000005                    MOV     #5,R0
3551  023242  000257                            CCC                     ;CC=1010
3552  023244  000271                            +SEN!SEC
3553  023246  022700  000005                    CMP     #5,R0           ;CC=0101
3554  023252  101002                            BHI     CMP1
3555  023254  102401                            BVS     CMP1
3556  023256  100006                            BPL     CMP2
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 766           <====
      023260                            CMP1:
      023260  012762  000471  177776            MOV     #471,-2(R2)     ;MOVE TO MAILBOX #  *******  471  *******
      023266  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      023272  000000                            HALT                    ;CMP DID NOT SET CC'S CORRECTLY
3557  023274  012700  100000            CMP2:   MOV     #100000,R0
3558  023300  000277                            SCC                     ;CC=1101
3559  023302  000242                            CLV
3560  023304  020027  077777                    CMP     R0,#77777       ;CC=0010
3561  023310  101402                            BLOS    CMP3
3562  023312  102001                            BVC     CMP3
3563  023314  100006                            BPL     CMP4
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 747           <====
      023316                            CMP3:
      023316  012762  000472  177776            MOV     #472,-2(R2)     ;MOVE TO MAILBOX #  *******  472  *******
      023324  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      023330  000000                            HALT                    ;CMP DID NOT SET CC'S CORRECTLY
3564  023332  052700  040000            CMP4:   BIS     #40000,R0       ;R0=140000
3565  023336  000257                            CCC                     ;CC=0100
3566  023340  000264                            SEZ
3567  023342  022700  040000                    CMP     #40000,R0       ;CC=1011
3568  023346  102003                            BVC     CMP5
3569  023350  103002                            BCC     CMP5
3570  023352  001401                            BEQ     CMP5
3571  023354  100406                            BMI     CMP6
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 727           <====
      023356                            CMP5:
      023356  012762  000473  177776            MOV     #473,-2(R2)     ;MOVE TO MAILBOX #  *******  473  *******
      023364  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      023370  000000                            HALT                    ;CMP DID NOT SET CC'S CORRECTLY
3572  023372  042700  040000            CMP6:   BIC     #40000,R0
3573  023376  000277                            SCC                     ;CC=1111
3574  023400  022700  177777                    CMP     #-1,R0          ;CC=0000
3575  023404  101402                            BLOS    CMP7
```

```
3576 023406  102401                          BVS     CMP7
3577 023410  100006                          BPL     TST221
                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                     ;           CONDITIONAL BRANCH INST. AND   <====
                                                     ;           REPLACE THE MOVE INSTRUCTION   <====
                                                     ;           WHICH FOLLOWS W/ 711           <====
     023412                                CMP7:
     023412  012762  000474  177776               MOV     #474,-2(R2)    ;MOVE TO MAILBOX #  *******  474  *******
     023420  005262  177774                       INC     -4(R2)         ;SET MSGTYP TO FATAL ERROR
     023424  000000                               HALT                   ;CMP DID NOT SET CC'S CORRECTLY
                                                                         ;  OR SEQUENCE ERROR
3578
```

```
3579                                    .SBTTL  TEST # 221 - TEST COM INSTRUCTION
                                        ;******************************************************************************
                                        ;TEST 221 - TEST COM INSTRUCTION
                                        ;******************************************************************************
      023426  005212                    TST221: INC     (R2)            ;UPDATE TEST NUMBER
      023430  022712  000221                    CMP     #221,(R2)       ;SEQUENCE ERROR?
      023434  001012                            BNE     TST222-10       ;BR TO ERROR HALT ON SEQ ERROR
3580  023436  012700  177777                    MOV     #-1,R0
3581  023442  000257                            CCC                     ;CC=1010
3582  023444  000265                            +SEC!SEZ
3583  023446  005100                            COM     R0              ;CC=0101
3584  023450  101002                            BHI     COM1
3585  023452  102401                            BVS     COM1
3586  023454  100006                            BPL     TST222
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 767           <====
      023456                            COM1:
      023456  012762  000475  177776            MOV     #475,-2(R2)     ;MOVE TO MAILBOX #  *******  475  *******
      023464  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      023470  000000                            HALT                    ;COM DID NOT SET CC'S CORRECTLY
                                                                        ;  OR SEQUENCE ERROR
3587
3588
3589                                    ;******************************************************************************
3590                                    ;
3591                                    ;       THESE NEXT TWO TESTS VERIFY THE FUNCTIONING OF THE SUB
3592                                    ;AND SBC INSTRUCTIONS.  BOTH OF THESE INSTRUCTIONS HANDLE THE
3593                                    ;C AND V BITS IDENTICALLY.  THE PROCEDURE IS TO PRESET THE CONDITION
3594                                    ;CODES, EXECUTE THE INSTRUCTION WITH A PARTICULAR SET OF DATA, AND
3595                                    ;THEN CHECK THE RESULTS BY EXECUTING A SERIES OF CONDITIONAL
3596                                    ;BRANCHES.  THIS PROCEDURE IS REPEATED SEVERAL TIMES WITH DIFFERENT
3597                                    ;DATA PATTERNS TO PROVIDE EVERY COMBINATION OF THE C AND V BITS.
3598                                    ;
```

```
3599                                    .SBTTL  TEST # 222 - TEST SUB INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 222 - TEST SUB INSTRUCTION
                                        ;*****************************************************************************
 023472  005212                       TST222: INC     (R2)            ;UPDATE TEST NUMBER
 023474  022712  000222                       CMP     #222,(R2)       ;SEQUENCE ERROR?
 023500  001065                             BNE     TST223-10       ;BR TO ERROR HALT ON SEQ ERROR
3600 023502  012700  125252                 MOV     #125252,R0
3601 023506  000257                         CCC                     ;CC=1010
3602 023510  000271                         +SEN!SEC
3603 023512  162700  125252                 SUB     #125252,R0      ;CC=0101   R0=0
3604 023516  101002                         BHI     SUB1
3605 023520  102401                         BVS     SUB1
3606 023522  100006                         BPL     SUB2
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 766           <====
 023524                             SUB1:
 023524  012762  000476  177776             MOV     #476,-2(R2)     ;MOVE TO MAILBOX #  *******  476  *******
 023532  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 023536  000000                             HALT                    ;SUB DID NOT SET CC'S CORRECTLY
3607 023540  052700  100000         SUB2:   BIS     #100000,R0
3608 023544  000277                         SCC                     ;CC=1101
3609 023546  000242                         CLV
3610 023550  162700  077777                 SUB     #77777,R0       ;CC=0010   R0=1
3611 023554  101402                         BLOS    SUB3
3612 023556  102001                         BVC     SUB3
3613 023560  100006                         BPL     SUB4
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 747           <====
 023562                             SUB3:
 023562  012762  000477  177776             MOV     #477,-2(R2)     ;MOVE TO MAILBOX #  *******  477  *******
 023570  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 023574  000000                             HALT                    ;
3614 023576  005100         SUB4:   COM     R0                      ;R0=177777
3615 023600  000277                 SCC                             ;CC=11111
3616
3617 023602  162700  100000                 SUB     #100000,R0      ;CC=0000   R0=77777
3618 023606  101402                         BLOS    SUB5
3619 023610  102401                         BVS     SUB5
3620 023612  100006                         BPL     SUB6
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 732           <====
 023614                             SUB5:
 023614  012762  000500  177776             MOV     #500,-2(R2)     ;MOVE TO MAILBOX #  *******  500  *******
 023622  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 023626  000000                             HALT                    ;SUB DID NOT SET CC'S CORRECTLY
3621 023630  000257         SUB6:   CCC                             ;CC=0100
3622 023632  000264                 SEZ
3623 023634  162700  140000                 SUB     #140000,R0      ;CC=1011
3624 023640  102003                         BVC     SUB7
3625 023642  103002                         BCC     SUB7
```

TEST # 222 - TEST SUB INSTRUCTION

```
3626 023644  001401                          BEQ     SUB7
3627 023646  100406                          BMI     TST223
                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                    ;           WHICH FOLLOWS W/ 714           <====
     023650                                 SUB7:
     023650  012762  000501  177776          MOV     #501,-2(R2)     ;MOVE TO MAILBOX #  *******  501  *******
     023656  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     023662  000000                          HALT                    ;
3628
```

```
                                .SBTTL  TEST # 223 - TEST SBC INSTRUCTION
                                ;*****************************************************************************
                                ;TEST 223 - TEST SBC INSTRUCTION
                                ;*****************************************************************************
 023664  005212                 TST223: INC     (R2)            ;UPDATE TEST NUMBER
 023666  022712  000223                 CMP     #223,(R2)       ;SEQUENCE ERROR?
 023672  001063                         BNE     TST224-10       ;BR TO ERROR HALT ON SEQ ERROR
3630 023674  012700  000001             MOV     #1,R0
3631 023700  000277                     SCC                     ;CC=1011
3632 023702  000244                     CLZ
3633 023704  005600                     SBC     R0              ;CC=0100   R=0
3634 023706  103403                     BCS     SBC1
3635 023710  102402                     BVS     SBC1
3636 023712  100401                     BMI     SBC1
3637 023714  001406                     BEQ     SBC2
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 766           <====
 023716                         SBC1:
 023716  012762  000502  177776         MOV     #502,-2(R2)     ;MOVE TO MAILBOX #  *******  502  *******
 023724  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 023730  000000                         HALT                    ;SBC DID NOT SET CC'S CORRECTLY
3638 023732  000277             SBC2:   SCC                     ;CC=1010
3639 023734  000245                     +CLZ!CLC
3640 023736  005600                     SBC     R0              ;CC=0100   R=0
3641 023740  103403                     BCS     SBC3
3642 023742  102402                     BVS     SBC3
3643 023744  100401                     BMI     SBC3
3644 023746  001406                     BEQ     SBC4
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 751           <====
 023750                         SBC3:
 023750  012762  000503  177776         MOV     #503,-2(R2)     ;MOVE TO MAILBOX #  *******  503  *******
 023756  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 023762  000000                         HALT                    ;SBC DID NOT SET CC'S CORRECTLY
3645 023764  000277             SBC4:   SCC                     ;CC=0111
3646 023766  000250                     CLN
3647 023770  005600                     SBC     R0              ;CC=1001   R0=177777
3648 023772  103003                     BCC     SBC5
3649 023774  102402                     BVS     SBC5
3650 023776  001401                     BEQ     SBC5
3651 024000  100406                     BMI     SBC6
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 734           <====
 024002                         SBC5:
 024002  012762  000504  177776         MOV     #504,-2(R2)     ;MOVE TO MAILBOX #  *******  504  *******
 024010  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 024014  000000                         HALT                    ;SBC DID NOT SET CC'S CORRECTLY
3652 024016  042700  077777     SBC6:   BIC     #77777,R0       ;R0=100000
3653 024022  000277                     SCC                     ;CC=1101
3654 024024  000242                     CLV
3655 024026  005600                     SBC     R0              ;CC=0010
```

```
3656 024030  101402                    BLOS    SBC7
3657 024032  102001                    BVC     SBC7
3658 024034  100006                    BPL     TST224
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 716           <====
     024036                             SBC7:
     024036  012762  000505  177776     MOV     #505,-2(R2)     ;MOVE TO MAILBOX #  *******  505  *******
     024044  005262  177774             INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     024050  000000                     HALT                    ;SBC DID NOT SET CC'S CORRECTLY
                                                                 ;  OR SEQUENCE ERROR
3659
3660                                ;*************************************************************************************
3661                                ;
3662                                ;       THESE NEXT FOUR TESTS VERIFY THE FUNCTIONING OF THE ROL,
3663                                ;ROR, ASL AND ASR INSTRUCTIONS.  SPECIAL DATA PATTERNS ARE LOADED
3664                                ;AND ROTATED SEVERAL TIMES FOR EACH TEST.  THE CONDITION CODES
3665                                ;ARE PRESET BEFORE EACH ROTATION AND THE CONDITION CODES ARE
3666                                ;CHECKED AFTER EACH ROTATION.  THE FINAL CHECK IN EACH TEST IS
3667                                ;TO VERIFY THE COMMULATIVE DATA RESULT.  THE DATA PATTERNS HAVE
3668                                ;BEEN SELECTED TO PRODUCE ALL COMBINATIONS OF THE C AND V BITS.
3669                                ;
```

```
                                .SBTTL  TEST # 224 - TEST ROL INSTRUCTION
                                ;*****************************************************************************
                                ;TEST 224 - TEST ROL INSTRUCTION
                                ;*****************************************************************************
 024052  005212                TST224: INC     (R2)            ;UPDATE TEST NUMBER
 024054  022712  000224                CMP     #224,(R2)       ;SEQUENCE ERROR?
 024060  001063                        BNE     TST225-10       ;BR TO ERROR HALT ON SEQ ERROR
3671 024062  012700  144000            MOV     #144000,R0      ;R0=144000
3672 024066  000257                    CCC                     ;CC=0110
3673 024070  000266                    +SEZ!SEV
3674 024072  006100                    ROL     R0              ;CC=1001   R0=110000
3675 024074  103003                    BCC     ROL1
3676 024076  102402                    BVS     ROL1
3677 024100  001401                    BEQ     ROL1
3678 024102  100406                    BMI     ROL2
                                                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                               ;           CONDITIONAL BRANCH INST. AND   <====
                                                               ;           REPLACE THE MOVE INSTRUCTION   <====
                                                               ;           WHICH FOLLOWS W/ 766           <====
 024104                         ROL1:
 024104  012762  000506  177776        MOV     #506,-2(R2)     ;MOVE TO MAILBOX #  *******  506  *******
 024112  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 024116  000000                        HALT                    ;
3679 024120  000277            ROL2:   SCC                     ;CC=1100
3680 024122  000243                    +CLV!CLC
3681 024124  006100                    ROL     R0              ;CC=0011   R0=020000
3682 024126  103003                    BCC     ROL3
3683 024130  102002                    BVC     ROL3
3684 024132  001401                    BEQ     ROL3
3685 024134  100006                    BPL     ROL4
                                                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                               ;           CONDITIONAL BRANCH INST. AND   <====
                                                               ;           REPLACE THE MOVE INSTRUCTION   <====
                                                               ;           WHICH FOLLOWS W/ 751           <====
 024136                         ROL3:
 024136  012762  000507  177776        MOV     #507,-2(R2)     ;MOVE TO MAILBOX #  *******  507  *******
 024144  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 024150  000000                        HALT                    ;ROL DID NOT SET CC'S CORRECTLY
3686 024152  000277            ROL4:   SCC                     ;CC=0111
3687 024154  000250                    CLN
3688 024156  006100                    ROL     R0              ;CC=0000   R0=040001
3689 024160  101402                    BLOS    ROL5
3690 024162  102401                    BVS     ROL5
3691 024164  100006                    BPL     ROL6
                                                               ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                               ;           CONDITIONAL BRANCH INST. AND   <====
                                                               ;           REPLACE THE MOVE INSTRUCTION   <====
                                                               ;           WHICH FOLLOWS W/ 735           <====
 024166                         ROL5:
 024166  012762  000510  177776        MOV     #510,-2(R2)     ;MOVE TO MAILBOX #  *******  510  *******
 024174  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 024200  000000                        HALT                    ;ROL DID NOT SET CC'S CORRECTLY
3692 024202  000257            ROL6:   CCC                     ;CC=0101
3693 024204  000265                    +SEZ!SEC
3694 024206  006100                    ROL     R0              ;CC=1010   R0=100003
3695 024210  101405                    BLOS    ROL7
3696 024212  102004                    BVC     ROL7
```

```
3697 024214  100003                        BPL     ROL7
3698 024216  022700  100003                CMP     #100003,R0
3699 024222  001406                        BEQ     TST225
                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                    ;           WHICH FOLLOWS W/ 716           <====
     024224                         ROL7:
     024224  012762  000511  177776          MOV     #511,-2(R2)     ;MOVE TO MAILBOX #  *******  511  *******
     024232  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     024236  000000                          HALT                    ;ROL MALFUNCTIONED
                                                                     ;  OR SEQUENCE ERROR
```

```
 3700                                   .SBTTL  TEST # 225 - TEST ROR INSTRUCTION
                                        ;******************************************************************************
                                        ;TEST 225 - TEST ROR INSTRUCTION
                                        ;******************************************************************************
      024240  005212                    TST225: INC     (R2)            ;UPDATE TEST NUMBER
      024242  022712  000225                    CMP     #225,(R2)       ;SEQUENCE ERROR?
      024246  001061                            BNE     TST226-10       ;BR TO ERROR HALT ON SEQ ERROR
 3701 024250  012700  000023                    MOV     #23,R0          ;R0=23
 3702 024254  000277                            SCC                     ;CC=0111
 3703 024256  000250                            CLN
 3704 024260  006000                            ROR     R0              ;CC=1001   R0=100011
 3705 024262  102403                            BVS     ROR1
 3706 024264  103002                            BCC     ROR1
 3707 024266  001401                            BEQ     ROR1
 3708 024270  100406                            BMI     ROR2
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 766           <====
      024272                            ROR1:
      024272  012762  000512  177776            MOV     #512,-2(R2)     ;MOVE TO MAILBOX #  *******  512  *******
      024300  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      024304  000000                            HALT                    ;ROR DID NOT SET CC'S CORRECTLY
 3709 024306  000257                    ROR2:   CCC                     ;CC=1100
 3710 024310  000274                            +SEN!SEZ
 3711 024312  006000                            ROR     R0              ;CC=0011   R0=040004
 3712 024314  102003                            BVC     ROR3
 3713 024316  103002                            BCC     ROR3
 3714 024320  001401                            BEQ     ROR3
 3715 024322  100006                            BPL     ROR4
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 751           <====
      024324                            ROR3:
      024324  012762  000513  177776            MOV     #513,-2(R2)     ;MOVE TO MAILBOX #  *******  513  *******
      024332  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      024336  000000                            HALT                    ;ROR DID NOT SET CC'S CORRECTLY
 3716 024340  000277                    ROR4:   SCC                     ;CC=1110
 3717 024342  000241                            CLC
 3718 024344  006000                            ROR     R0              ;CC=0000   R0=020002
 3719 024346  101403                            BLOS    ROR5
 3720 024350  102402                            BVS     ROR5
 3721 024352  001401                            BEQ     ROR5
 3722 024354  100006                            BPL     ROR6
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 734           <====
      024356                            ROR5:
      024356  012762  000514  177776            MOV     #514,-2(R2)     ;MOVE TO MAILBOX #  *******  514  *******
      024364  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      024370  000000                            HALT                    ;ROR DID NOT SET CC'S CORRECTLY
 3723 024372  000257                    ROR6:   CCC                     ;CC=0101
 3724 024374  000265                            +SEC!SEZ
 3725 024376  006000                            ROR     R0              ;CC=1010   R0=110001
 3726 024400  101402                            BLOS    ROR7
```

TEST # 225 - TEST ROR INSTRUCTION

```
3727 024402  102001                          BVC     ROR7
3728 024404  100406                          BMI     TST226
                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                    ;           WHICH FOLLOWS W/ 720           <====
     024406                          ROR7:
     024406  012762  000515  177776               MOV     #515,-2(R2)   ;MOVE TO MAILBOX #  *******  515  *******
     024414  005262  177774                       INC     -4(R2)        ;SET MSGTYP TO FATAL ERROR
     024420  000000                               HALT                  ;ROR DID NOT PRODUCE CORRECT RESULTS
                                                                         ;  OR SEQUENCE ERROR
```

```
3729                                    .SBTTL  TEST # 226 - TEST ASL INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 226 - TEST ASL INSTRUCTION
                                        ;*****************************************************************************
     024422  005212                   TST226: INC     (R2)            ;UPDATE TEST NUMBER
     024424  022712  000226                   CMP     #226,(R2)       ;SEQUENCE ERROR?
     024430  001064                           BNE     TST227-10       ;BR TO ERROR HALT ON SEQ ERROR
3730 024432  012700  144000                   MOV     #144000,R0      ;R0=14000
3731 024436  000257                           CCC                     ;CC=0110
3732 024440  000271                           +SEN!SEC
3733 024442  006300                           ASL     R0              ;CC=1001   R0=110000
3734 024444  103003                           BCC     ASL1
3735 024446  102402                           BVS     ASL1
3736 024450  001401                           BEQ     ASL1
3737 024452  100406                           BMI     ASL2
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 766           <====
     024454                             ASL1:
     024454  012762  000516  177776           MOV     #516,-2(R2)     ;MOVE TO MAILBOX #  *******  516  *******
     024462  005262  177774                   INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     024466  000000                           HALT                    ;
3738 024470  000277                     ASL2: SCC                     ;CC=1100
3739 024472  000243                           +CLV!CLC
3740 024474  006300                           ASL     R0              ;CC=0011   R0=020000
3741 024476  103003                           BCC     ASL3
3742 024500  102002                           BVC     ASL3
3743 024502  001401                           BEQ     ASL3
3744 024504  100006                           BPL     ASL4
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 751           <====
     024506                             ASL3:
     024506  012762  000517  177776           MOV     #517,-2(R2)     ;MOVE TO MAILBOX #  *******  517  *******
     024514  005262  177774                   INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     024520  000000                           HALT                    ;ASL DID NOT SET CC'S CORRECTLY
3745 024522  000277                     ASL4: SCC                     ;CC=0111
3746 024524  000250                           CLN
3747 024526  006300                           ASL     R0              ;CC=0000   R0=040000
3748 024530  101402                           BLOS    ASL5
3749 024532  102401                           BVS     ASL5
3750 024534  100006                           BPL     ASL6
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 735           <====
     024536                             ASL5:
     024536  012762  000520  177776           MOV     #520,-2(R2)     ;MOVE TO MAILBOX #  *******  520  *******
     024544  005262  177774                   INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     024550  000000                           HALT                    ;ASL DID NOT SET CC'S CORRECTLY
3751 024552  000257                     ASL6: CCC                     ;CC=0101
3752 024554  000265                           +SEZ!SEC
3753 024556  006300                           ASL     R0              ;CC=1010   R0=100000
3754 024560  103406                           BCS     ASL7
3755 024562  001405                           BEQ     ASL7
```

```
3756 024564  102004                    BVC     ASL7
3757 024566  100003                    BPL     ASL7
3758 024570  022700  100000            CMP     #100000,R0
3759 024574  001406                    BEQ     TST227
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 715           <====
     024576                         ASL7:
     024576  012762  000521  177776    MOV     #521,-2(R2)     ;MOVE TO MAILBOX #  *******  521  *******
     024604  005262  177774            INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     024610  000000                    HALT                    ;ASL MALFUNCTIONED
                                                                ;  OR SEQUENCE ERROR
```

```
3760                                    .SBTTL  TEST # 227 - TEST ASR INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 227 - TEST ASR INSTRUCTION
                                        ;*****************************************************************************
     024612  005212                   TST227: INC     (R2)            ;UPDATE TEST NUMBER
     024614  022712  000227                   CMP     #227,(R2)       ;SEQUENCE ERROR?
     024620  001070                           BNE     TST230-10       ;BR TO ERROR HALT ON SEQ ERROR
3761 024622  012700  100023                   MOV     #100023,R0      ;R0=100023
3762 024626  000277                           SCC                     ;CC=0110
3763 024630  000250                           CLN
3764 024632  006200                           ASR     R0              ;CC=1001   RP=140011
3765 024634  102403                           BVS     ASR1
3766 024636  103002                           BCC     ASR1
3767 024640  001401                           BEQ     ASR1
3768 024642  100406                           BMI     ASR2
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 766           <====
     024644                             ASR1:
     024644  012762  000522  177776             MOV     #522,-2(R2)     ;MOVE TO MAILBOX #  *******  522  *******
     024652  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     024656  000000                             HALT                    ;ASR DID NOT SET CC'S CORRECTLY
3769 024660  042700  100000             ASR2:   BIC     #100000,R0      ;R0=40011
3770 024664  000277                             SCC                     ;CC=1100
3771 024666  000243                             +CLV!CLC
3772 024670  006200                             ASR     R0              ;CC=0011   R0=020004
3773 024672  102003                             BVC     ASR3
3774 024674  103002                             BCC     ASR3
3775 024676  001401                             BEQ     ASR3
3776 024700  100006                             BPL     ASR4
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 747           <====
     024702                             ASR3:
     024702  012762  000523  177776             MOV     #523,-2(R2)     ;MOVE TO MAILBOX #  *******  523  *******
     024710  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     024714  000000                             HALT                    ;ASR DID NOT SET CC'S CORRECTLY
3777 024716  000277                     ASR4:   SCC                     ;CC=1111
3778
3779 024720  006200                             ASR     R0              ;CC=0000   R0=010002
3780 024722  101403                             BLOS    ASR5
3781 024724  102402                             BVS     ASR5
3782 024726  001401                             BEQ     ASR5
3783 024730  100006                             BPL     ASR6
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 733           <====
     024732                             ASR5:
     024732  012762  000524  177776             MOV     #524,-2(R2)     ;MOVE TO MAILBOX #  *******  524  *******
     024740  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     024744  000000                             HALT                    ;ASR DID NOT SET CC'S CORRECTLY
3784 024746  052700  100000             ASR6:   BIS     #100000,R0      ;R0=110002
3785 024752  000257                             CCC                     ;CC=0101
3786 024754  000265                             +SEZ!SEC
```

```
3787 024756  006200                          ASR     R0              ;C=1010   R0=144001
3788 024760  101406                          BLOS    ASR7
3789 024762  102005                          BVC     ASR7
3790 024764  100004                          BPL     ASR7
3791 024766  001403                          BEQ     ASR7
3792 024770  022700  144001                  CMP     #144001,R0      ;CHECK RESULT OF ASR'S
3793 024774  001406                          BEQ     TST230
                                                                     ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                     ;           CONDITIONAL BRANCH INST. AND   <====
                                                                     ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                     ;           WHICH FOLLOWS W/ 711           <====
     024776                               ASR7:
     024776  012762  000525  177776          MOV     #525,-2(R2)     ;MOVE TO MAILBOX #  *******  525  *******
     025004  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     025010  000000                          HALT                    ;ASR DID NOT FUNCTION CORRECTLY
                                                                     ;  OR SEQUENCE ERROR
3800
3801
3802
3803                                 ;*****************************************************************************
3804                                 ;
3805                                 ;       THIS TEST VERIFIES THE SXT INSTRUCTION. CONDITION CODES
3806                                 ;ARE PRESET IN EACH OF THE TWO POSSIBLE CASES. WITH THE N-BIT SET,
3807                                 ;THE TEST CHECKS FOR ALL ONES IN THE DESTINATION. WITH THE N-BIT
3808                                 ;CLEAR, THE DESTINATION SHOULD CONTAIN ALL ZEROES. THE DATA
3809                                 ;IS VERIFIED BY CONDITIONAL BRANCHES.
3810                                 ;
```

TEST # 230 - TEST THE SXT INSTRUCTION

```
3811                                    .SBTTL  TEST # 230 - TEST THE SXT INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 230 - TEST THE SXT INSTRUCTION
                                        ;*****************************************************************************
      025012  005212                    TST230: INC     (R2)            ;UPDATE TEST NUMBER
      025014  022712  000230                    CMP     #230,(R2)       ;SEQUENCE ERROR?
      025020  001037                            BNE     TST231-10       ;BR TO ERROR HALT ON SEQ ERROR
3812  025022  005000                            CLR     R0
3813  025024  000277                            SCC                     ;SET CC=1011
3814  025026  000244                            CLZ
3815  025030  006700                            SXT     R0              ;TRY SXT
3816  025032  100006                            BPL     SXT0            ;TEST CC=1001
3817  025034  001405                            BEQ     SXT0
3818  025036  102404                            BVS     SXT0
3819  025040  103003                            BCC     SXT0
3820  025042  022700  177777                    CMP     #-1,R0          ;CHECK DATA RESULT
3821  025046  001406                            BEQ     SXT1
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
      025050                            SXT0:
      025050  012762  000526  177776            MOV     #526,-2(R2)     ;MOVE TO MAILBOX #  *******  526  *******
      025056  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      025062  000000                            HALT                    ;RESULTS OF SXT INCORRECT
3822  025064  005000                    SXT1:   CLR     R0              ;R0=0
3823  025066  005010                            CLR     (R0)            ;LOC. 0=0
3824  025070  005110                            COM     (R0)            ;LOC. 0=177777
3825  025072  000257                            CCC                     ;SET CC=0110
3826  025074  000266                            +SEZ!SEV
3827  025076  006710                            SXT     (R0)
3828  025100  001005                            BNE     SXT2            ;TEST CC=0100
3829  025102  103404                            BCS     SXT2
3830  025104  102403                            BVS     SXT2
3831  025106  100402                            BMI     SXT2
3832  025110  005710                            TST     (R0)
3833  025112  001406                            BEQ     TST231
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 742           <====
      025114                            SXT2:
      025114  012762  000527  177776            MOV     #527,-2(R2)     ;MOVE TO MAILBOX #  *******  527  *******
      025122  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      025126  000000                            HALT                    ;RESULTS OF SXT INCORRECT
                                                                        ;  OR SEQUENCE ERROR
3834                                    ;*****************************************************************************
3835                                    ;
3836                                    ;       THIS TEST VERIFIES THE XOR INSTRUCTION. UNIQUE PATTERNS
3837                                    ;OF ONES AND ZEROES ARE MOVED TO DATA REGISTERS R0 AND R1.
3838                                    ;AFTER THE FIRST XOR INSTRUCTION R0=36146. AN XOR IS THEN
3839                                    ;EXECUTED WITH THIS NEW VALUE AND THE CONTENTS OF R1 TO
3840                                    ;REPRODUCE THE ORIGINAL VALUE IF R0=31525.
3841                                    ;
```

```
3842                                    .SBTTL  TEST # 231 - TEST THE XOR INSTRUCTION
                                        ;*************************************************************************************
                                        ;TEST 231 - TEST THE XOR INSTRUCTION
                                        ;*************************************************************************************
     025130  005212                     TST231: INC     (R2)            ;UPDATE TEST NUMBER
     025132  022712  000231                     CMP     #231,(R2)       ;SEQUENCE ERROR?
     025136  001041                             BNE     TST232-10       ;BR TO ERROR HALT ON SEQ ERROR
3843 025140  012700  007463                     MOV     #7463,R0        ;SET UP R0
3844 025144  012701  031525                     MOV     #31525,R1       ;SET UP R1
3845 025150  000277                             SCC                     ;SET CC=1110
3846 025152  000241                             CLC
3847 025154  074100                             XOR     R1,R0           ;TRY XOR
3848 025156  101406                             BLOS    XOR1            ;CC=0000?
3849 025160  102405                             BVS     XOR1
3850 025162  001404                             BEQ     XOR1
3851 025164  100403                             BMI     XOR1
3852 025166  022700  036146                     CMP     #36146,R0       ;DATA RESULT CORRECT?
3853 025172  001406                             BEQ     XOR2
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 761           <====
     025174                             XOR1:
     025174  012762  000530  177776             MOV     #530,-2(R2)     ;MOVE TO MAILBOX #  *******  530  *******
     025202  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     025206  000000                             HALT                    ;
3854 025210  010104                     XOR2:   MOV     R1,R4
3855 025212  000261                             SEC                     ;CC=1110
3856 025214  000241                             CLC
3857 025216  074400                             XOR     R4,R0           ;TRY XOR MODE 0,0
3858 025220  101406                             BLOS    XOR3            ;CC=0000?
3859 025222  102405                             BVS     XOR3
3860 025224  001404                             BEQ     XOR3
3861 025226  100403                             BMI     XOR3
3862 025230  022700  007463                     CMP     #7463,R0
3863 025234  001406                             BEQ     TST232
                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 740           <====
     025236                             XOR3:
     025236  012762  000531  177776             MOV     #531,-2(R2)     ;MOVE TO MAILBOX #  *******  531  *******
     025244  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     025250  000000                             HALT                    ;RESULT OF XOR INCORRECT
                                                ;  OR SEQUENCE ERROR
3864                                    ;*************************************************************************************
3865                                    ;
3866                                    ;       THIS TEST VERIFIES THE SOB INSTRUCTION. R4 IS USED AS A
3867                                    ;COUNTER WHILE R0 IS THE ADDRESS REGISTER. CONDITIONAL
3868                                    ;BRANCHES ARE USED TO VERIFY PROPER TRANSFER OF CONTROL
3869                                    ;WHILE R4 IS CHECKED TO INSURE PROPER DECREMENTING OF R0.
3870                                    ;
```

```
3871                                    .SBTTL  TEST # 232 - TEST SOB INSTRUCTION
                                        ;*****************************************************************************
                                        ;TEST 232 - TEST SOB INSTRUCTION
                                        ;*****************************************************************************
     025252  005212                     TST232: INC     (R2)            ;UPDATE TEST NUMBER
     025254  022712  000232                     CMP     #232,(R2)       ;SEQUENCE ERROR?
     025260  001027                             BNE     TST233-10       ;BR TO ERROR HALT ON SEQ ERROR
3872 025262  012700  000525                     MOV     #525,R0
3873 025266  010004                             MOV     R0,R4
3874 025270  000277                             SCC                     ;SET CC=1111
3875 025272  101002                     SOB1:   BHI     SOB2            ;CC=1111?
3876 025274  100001                             BPL     SOB2
3877 025276  102406                             BVS     SOB3
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 770           <====
     025300                             SOB2:
     025300  012762  000532  177776             MOV     #532,-2(R2)     ;MOVE TO MAILBOX #  *******  532  *******
     025306  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     025312  000000                             HALT                    ;
3878 025314  005304                     SOB3:   DEC     R4              ;COUNT ITERATIONS
3879 025316  000277                             SCC                     ;CC=1111
3880 025320  077014                             SOB     R0,SOB1         ;DO SOB W/ R0
3881 025322  101004                             BHI     SOB4            ;CHECK CC=1111
3882 025324  100003                             BPL     SOB4
3883 025326  102002                             BVC     SOB4
3884 025330  005704                             TST     R4              ;ITERATION COUNT OK?
3885 025332  001406                             BEQ     TST233
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 752           <====
     025334                             SOB4:
     025334  012762  000533  177776             MOV     #533,-2(R2)     ;MOVE TO MAILBOX #  *******  533  *******
     025342  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     025346  000000                             HALT                    ;INCORRECT # OF BRANCHES OR CC'S CHANGED
                                                                         ;  OR SEQUENCE ERROR
3886                                    ;*****************************************************************************
3887                                    ;
3888                                    ;       THIS TEST VERIFIES THE MARK INSTRUCTION. THE EFFECTS
3889                                    ;OF THE MARK INSTRUCTION ARE SIMULATED BY THE PROGRAM INSTRUCTIONS.
3890                                    ;THE CONTENTS OF R5 AND THE STACK POINTER ARE CHECKED AFTER EACH
3891                                    ;OF THE TWO ROUTINES IN THE TEST.
3892                                    ;
```

```
                                .SBTTL  TEST # 233 - TEST MARK INSTRUCTION
                                ;*****************************************************************************
                                ;TEST 233 - TEST MARK INSTRUCTION
                                ;*****************************************************************************
 025350  005212                 TST233: INC     (R2)            ;UPDATE TEST NUMBER
 025352  022712  000233                 CMP     #233,(R2)       ;SEQUENCE ERROR?
 025356  001072                         BNE     TST234-10       ;BR TO ERROR HALT ON SEQ ERROR
3894 025360  012706  001000             MOV     #STBOT,SP
3895 025364  012746  125252             MOV     #125252,-(SP)   ;PUT R5 VALUE ON STACK
3896 025370  162706  000074             SUB     #74,SP          ;EFFECTIVELY PUT 36 ARGUMENTS ON STACK
3897 025374  012705  025426             MOV     #MRK1,R5        ;SET NEW PC IN R5
3898 025400  012746  006436             MOV     #6436,-(SP)     ;PUT MARK 36 INST. ON STACK
3899 025404  000277                     SCC                     ;SET CC=1111
3900 025406  000137  000700             JMP     @#700           ;XFER CONTL TO MARK 36 INST. ON STACK
3901 025412  012762  000534  177776     MOV     #534,-2(R2)     ;MOVE TO MAILBOX #  *******  534  *******
 025420  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 025424  000000                         HALT                    ;MARK INST. SHOULD HAVE JUMPED TO MRK1
3902 025426  101010             MRK1:   BHI     MRK2            ;TEST CC UNAFFECTED
3903 025430  100007                     BPL     MRK2            ;IE. CC=1111
3904 025432  102006                     BVC     MRK2
3905 025434  020527  125252             CMP     R5,#125252      ;CHECK R5 RESTORED FROM STACK
3906 025440  001003                     BNE     MRK2
3907 025442  022706  001000             CMP     #STBOT,R6       ;CHECK STACK POINTER READJUSTED CORRECTLY.
3908 025446  001406                     BEQ     MRK3
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 743           <====
 025450                         MRK2:
 025450  012762  000535  177776         MOV     #535,-2(R2)     ;MOVE TO MAILBOX #  *******  535  *******
 025456  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 025462  000000                         HALT                    ;RESULTS OF MARK INCORRECT
3909 025464  012746  052525     MRK3:   MOV     #52525,-(SP)
3910 025470  012746  006400             MOV     #6400,-(SP)     ;PUT MARK 0 INST. ON STACK
3911 025474  010605                     MOV     SP,R5           ;SET ADDR. OF MARK INST. IN R5
3912 025476  004737  025506             JSR     PC,@#MRK4       ;DO JSR
3913 025502  000137  025524             JMP     @#MRK5          ;
3914 025506  000205             MRK4:   RTS     R5              ;DO RTS WITH R5 TO MARK INST ON STACK
3915 025510  012762  000536  177776     MOV     #536,-2(R2)     ;MOVE TO MAILBOX #  *******  536  *******
 025516  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 025522  000000                         HALT                    ;RTS,MARK SEQUENCE FAILED
3916 025524  022706  001000     MRK5:   CMP     #STBOT,R6       ;STACK ADJUSTED CORRECTLY
3917 025530  001003                     BNE     MRK6            ;IF NOT:  BR
3918 025532  022705  052525             CMP     #52525,R5       ;CHECK IF R5 RESTORED FROM STACK
3919 025536  001406                     BEQ     TST234
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 707           <====
 025540                         MRK6:
 025540  012762  000537  177776         MOV     #537,-2(R2)     ;MOVE TO MAILBOX #  *******  537  *******
 025546  005262  177774                 INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 025552  000000                         HALT                    ;RESULTS OF MARK INCORRECT
                                                                ;  OR SEQUENCE ERROR
3920                            ;*****************************************************************************
3921                            ;
3922                            ;       THIS TEST VERIFIES THAT RESET DOES NOT CLEAR THE PSW.
```

```
                                ;THE PSW IS LOADED WITH ONES, A RESET IS ISSUED, AND THE
                                ;CONTENTS OF THE PSW ARE CHECKED TO VERIFY THAT THEY HAVE NOT
                                ;CHANGED. THIS TEST IS EXECUTED ONLY ONCE EVERY 256 (DECIMAL)
                                ;PASSES.
                                ;
```

TEST # 234 - TEST THAT RESET DOES NOT CLEAR PSW

```
                                        .SBTTL  TEST # 234 - TEST THAT RESET DOES NOT CLEAR PSW
                                        ;*************************************************************************************
                                        ;TEST 234 - TEST THAT RESET DOES NOT CLEAR PSW
                                        ;*************************************************************************************
 025554  005212                        TST234: INC     (R2)            ;UPDATE TEST NUMBER
 025556  022712  000234                        CMP     #234,(R2)       ;SEQUENCE ERROR?
 025562  001016                                BNE     TST235-10       ;BR TO ERROR HALT ON SEQ ERROR
3929 025564  123727  042100  000377            CMPB    @#PASSPT,#377           ;ONLY DUE RESET EVERY 256. PASSES
3930 025572  001016                            BNE     REST                    ;BR IF TO SKIP TEST
3931 025574  012737  000357  177776            MOV     #357,@#PS               ;MOV ONES TO PSW
3932 025602  000005                            RESET
3933 025604  022737  000357  177776            CMP     #357,@#PS               ;PSW CORRECT?
3934 025612  001406                            BEQ     TST235
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 763           <====
 025614  012762  000540  177776                MOV     #540,-2(R2)     ;MOVE TO MAILBOX #  *******  540  *******
 025622  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 025626  000000                                HALT                    ;RESET ALTERED PSW
                                                                        ;  OR SEQUENCE ERROR
3935 025630                            REST:
3936
3937                                    ;*************************************************************************************
3938                                    ;
3939                                    ;       THE FOLLOWING TEST CHECKS THE INDEPENDENT FUNCTIONING OF BASIC
3940                                    ;DATA PATH COMPONENTS WITH USER/SUPERVISOR  MODE SET.
3941                                    ;
```

```
                                .SBTTL  TEST # 235 - TEST USER/SUPER  S.P. CAN HOLD A 1 IN EVERY BIT
                                ;*************************************************************************************
                                ;TEST 235 - TEST USER/SUPER  S.P. CAN HOLD A 1 IN EVERY BIT
                                ;*************************************************************************************
025630  005212                  TST235: INC     (R2)            ;UPDATE TEST NUMBER
025632  022712  000235                  CMP     #235,(R2)       ;SEQUENCE ERROR?
025636  001040                          BNE     TST236-10       ;BR TO ERROR HALT ON SEQ ERROR
3943 025640  052767  140000  152130          BIS     #USRM,PS        ;SET USER MODE
3944 025646  012706  000001                  MOV     #1,R6           ;SET BIT0
3945 025652  000241                          CLC                     ;CLEAR C-BIT
3946 025654  006106                  USP1:   ROL     R6              ;ROTATE 1 POSITION
3947 025656  103376                          BCC     USP1            ;BR IF NOT ALL DONE
3948 025660  042767  140000  152110          BIC     #USRM,PS        ;CLEAR USER MODE
3949 025666  001406                          BEQ     SSP1A
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 763           <====
025670  012762  000541  177776          MOV     #541,-2(R2)     ;MOVE TO MAILBOX #  *******  541  *******
025676  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
025702  000000                          HALT                    ;USER MODE R6 PICKED A BIT
3950 025704  042767  100000  152064  SSP1A:  BIC     #100000,PS      ;SET SUPERVISON MODE
3951 025712  012706  000001                  MOV     #1,R6           ;SET BIT0
3952 025716  000241                          CLC                     ;CLEAR C-BIT
3953 025720  006106                  SSP2:   ROL     R6              ;ROTATE 1 POSITION
3954 025722  103376                          BCC     SSP2            ;BR IF NOT ALL DONE
3955 025724  042767  140000  152044          BIC     #140000,PS      ;CLEAR SUPERVISON MODE
3956 025732  001406                          BEQ     TST236
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 741           <====
025734  012762  000542  177776          MOV     #542,-2(R2)     ;MOVE TO MAILBOX #  *******  542  *******
025742  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
025746  000000                          HALT                    ;SUPER MODE R6 PICKED A BIT
                                                                ;  OR SEQUENCE ERROR
3957 025750                     USP2:
3958
3959                            ;*************************************************************************************
3960                            ;
3961                            ;       THIS TEST CHECKS THE INDEPENDENT FUNCTIONING OF THE USER
3962                            ;SUPERVISOR AND KERNEL MODE R6'S. R6 IS SETUP AND ADDRESSED IN EACH
3963                            ;OF THE TWO MODES TO VERIFY THAT THE TWO R6'S ARE INDEPENDENT
3964                            ;OF EACH OTHER.
3965                            ;
```

```
                                .SBTTL  TEST # 236 - TEST INDEPENDENCE OF USER/SUPER/KERNEL MODE R6,R6
                                ;*****************************************************************************
                                ;TEST 236 - TEST INDEPENDENCE OF USER/SUPER/KERNEL MODE R6,R6
                                ;*****************************************************************************
025750  005212                  TST236: INC     (R2)            ;UPDATE TEST NUMBER
025752  022712  000236                  CMP     #236,(R2)       ;SEQUENCE ERROR?
025756  001134                          BNE     TST237-10       ;BR TO ERROR HALT ON SEQ ERROR
3967 025760  052767  140000  152010          BIS     #USRM,PS        ;SET USER MODE
3968 025766  012706  011111                  MOV     #011111,R6              ;SET USER R6 TO #011111
3969 025772  042767  100000  151776          BIC     #100000,PS      ;SET SUPERVISOR MODE
3970 026000  012706  022222                  MOV     #022222,R6              ;SET SUPER R6 TO #022222
3971 026004  042767  140000  151764          BIC     #140000,PS              ;SET KERNEL MODE
3972 026012  012706  033333                  MOV     #033333,R6              ;SET KERNEL R6 TO #033333
3973 026016  022706  033333                  CMP     #033333,R6              ;VERIFY R6 WITH KERNEL
3974 026022  001406                          BEQ     USP2A

                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 755           <====
026024  012762  000543  177776          MOV     #543,-2(R2)     ;MOVE TO MAILBOX #  *******  543  *******
026032  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
026036  000000                          HALT                    ;DUAL ADDRESSING SEQUENCE ERROR
3975 026040  052767  040000  151730  USP2A:  BIS     #040000,PS      ;SET SUPER MODE
3976 026046  022706  022222                  CMP     #022222,R6      ;VERIFY R6 WITH SUPER
3977 026052  001406                          BEQ     USP3

                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 741           <====
026054  012762  000544  177776          MOV     #544,-2(R2)     ;MOVE TO MAILBOX #  *******  544  *******
026062  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
026066  000000                          HALT                    ;DUAL ADDRESSING SEQUENCE ERROR
3978 026070  052767  140000  151700  USP3:   BIS     #USRM,PS        ;SET USER MODE
3979 026076  022706  011111                  CMP     #011111,R6              ;VERIFY R6 WITH USER
3980 026102  001406                          BEQ     USP4

                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 725           <====
026104  012762  000545  177776          MOV     #545,-2(R2)     ;MOVE TO MAILBOX #  *******  545  *******
026112  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
026116  000000                          HALT                    ;DUAL ADDRESSING SEQUENCE ERROR
3981 026120  042767  140000  151650  USP4:   BIC     #140000,PS      ;SET KERNEL MODE
3982 026126  012706  044444                  MOV     #044444,R6              ;SET R6 TO #044444
3983 026132  052767  040000  151636          BIS     #040000,PS      ;SET SUPER MODE
3984 026140  012706  055555                  MOV     #055555,R6              ;SET R6 TO #055555
3985 026144  052767  140000  151624          BIS     #140000,PS      ;SET USER MODE
3986 026152  012706  066666                  MOV     #066666,R6              ;SET R6 TO #066666
3987 026156  022706  066666                  CMP     #066666,R6              ;CHECK  R6 TO  #066666
3988 026162  001406                          BEQ     USP5

                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 675           <====
026164  012762  000546  177776          MOV     #546,-2(R2)     ;MOVE TO MAILBOX #  *******  546  *******
026172  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
026176  000000                          HALT                    ;DUAL ADDRESSING SEQUENCE ERROR
```

```
3989 026200  042767  100000  151570  USP5:   BIC     #100000,PS          ;SET SUPER MODE
3990 026206  022706  055555                  CMP     #055555,R6                  ;CHECK  R6  #055555
3991 026212  001406                          BEQ     USP6
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                 ;           CONDITIONAL BRANCH INST. AND   <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                 ;           WHICH FOLLOWS W/ 661           <====
     026214  012762  000547  177776          MOV     #547,-2(R2)         ;MOVE TO MAILBOX #  *******  547  *******
     026222  005262  177774                  INC     -4(R2)              ;SET MSGTYP TO FATAL ERROR
     026226  000000                          HALT                        ;DUAL ADDRESSING SEQUENCE ERROR
3992 026230  042767  140000  151540  USP6:   BIC     #140000,PS              ;SET KERNEL MODE
3993 026236  022706  044444                  CMP     #044444,R6              ;CHECK R6 FOR #055555
3994 026242  001406                          BEQ     TST237
                                                                 ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                 ;           CONDITIONAL BRANCH INST. AND   <====
                                                                 ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                 ;           WHICH FOLLOWS W/ 645           <====
     026244  012762  000550  177776          MOV     #550,-2(R2)         ;MOVE TO MAILBOX #  *******  550  *******
     026252  005262  177774                  INC     -4(R2)              ;SET MSGTYP TO FATAL ERROR
     026256  000000                          HALT                        ;DUAL ADDRESSING SEQUENCE ERROR
                                                                 ;  OR SEQUENCE ERROR
3995
3996                                 ;*************************************************************************************
3997                                 ;
3998                                 ;       THESE NEXT TWO TESTS VERIFY MFPI AND MTPI INSTRUCTIONS
3999                                 ;WITH R6 IN MODE 0.
4000                                 ;
```

```
4001                                    .SBTTL  TEST # 237 - TEST MFPI WITH R6 IN MODE 0
                                        ;*****************************************************************************
                                        ;TEST 237 - TEST MFPI WITH R6 IN MODE 0
                                        ;*****************************************************************************
                                        TST237: INC     (R2)            ;UPDATE TEST NUMBER
     026260  005212
     026262  022712  000237                    CMP     #237,(R2)       ;SEQUENCE ERROR?
     026266  001037                             BNE     TST240-10       ;BR TO ERROR HALT ON SEQ ERROR
4002 026270  012706  001000                     MOV     #STBOT,R6               ;INITIALIZE KERNEL STACK POINTER
4003 026274  012767  140000  151474             MOV     #USRM,PS                ;SET USER MODE.PREVIOUS KERNEL
4004 026302  012706  042402                     MOV     #USTBOT,R6              ;INITIALIZE USER STACK POINTER
4005 026306  006506                             MFPI    R6                      ;TRY MFPI WITH MODE 0
4006 026310  022767  140000  151460             CMP     #140000,PS              ;CHECK PSW
4007 026316  001412                             BEQ     MFPI0                   ;BR IF NO ERROR
4008 026320  042767  140000  151450             BIC     #USRM,PS                ;CLEAR USER MODE
4009 026326  001423                             BEQ     TST240
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 757           <====
     026330  012762  000551  177776             MOV     #551,-2(R2)     ;MOVE TO MAILBOX #  *******  551  *******
     026336  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     026342  000000                             HALT                    ;INCORRECT PSW FROM MFPI
                                                                        ;  OR SEQUENCE ERROR
4010 026344  022767  001000  014026 MFPI0:     CMP     #STBOT,USTBOT-2         ;CHECK DATA ON STACK
4011 026352  001411                             BEQ     MFPI0A                  ;BR IF NO ERROR
4012 026354  042767  140000  151414             BIC     #USRM,PS                ;CLEAR USER MODE
4013 026362  012762  000552  177776             MOV     #552,-2(R2)     ;MOVE TO MAILBOX #  *******  552  *******
     026370  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     026374  000000                             HALT                    ;INCORRECT DATA FROM MFPI
4014 026376                             MFPI0A:
4015
```

```
4016                                    .SBTTL  TEST # 240 - TEST MTPI WITH R6 IN MODE 0
                                        ;*************************************************************************
                                        ;TEST 240 - TEST MTPI WITH R6 IN MODE 0
                                        ;*************************************************************************
     026376  005212                     TST240: INC     (R2)            ;UPDATE TEST NUMBER
     026400  022712  000240                     CMP     #240,(R2)       ;SEQUENCE ERROR?
     026404  001037                             BNE     TST241-10       ;BR TO ERROR HALT ON SEQ ERROR
4017 026406  005067  151364                     CLR     PS                      ;SET KERNEL MODE
4018 026412  005006                             CLR     R6                      ;INITIALIZE KERNEL R6
4019 026414  012767  140000  151354             MOV     #USRM,PS                ;SET USER MODE/PREVIOUS KERNEL
4020 026422  012706  042402                     MOV     #USTBOT,R6              ;INITIALIZE USER STACK POINTER
4021 026426  012746  001000                     MOV     #STBOT,-(R6)            ;SET UP TARGET DATA
4022 026432  006606                             MTPI    R6                      ;TRY MODE 0 MTPI
4023 026434  022767  140000  151334             CMP     #USRM,PS                ;CHECK PSW
4024 026442  001411                             BEQ     MTPI0                   ;BR IF NO ERROR
4025 026444  042767  140000  151324             BIC     #USRM,PS                ;CLEAR USER MODE
4026 026452  012762  000553  177776             MOV     #553,-2(R2)     ;MOVE TO MAILBOX #  *******  553  *******
     026460  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     026464  000000                             HALT                    ;PS INCORRECT FOLLOWING MTPI
4027 026466  005067  151304             MTPI0:  CLR     PS                      ;SET KERNEL MODE
4028 026472  020627  001000                     CMP     R6,#STBOT               ;CHECK TARGET DATA
4029 026476  001406                             BEQ     TST241

                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                ;           WHICH FOLLOWS W/ 742           <====
     026500  012762  000554  177776             MOV     #554,-2(R2)     ;MOVE TO MAILBOX #  *******  554  *******
     026506  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     026512  000000                             HALT                    ;DATA INCORRECT FOLLOWING MTPI
                                                ;  OR SEQUENCE ERROR

4030
4031
4032                                    ;*************************************************************************
4033                                    ;
4034                                    ;       THIS TEST VERIFIES THE CONTENTS OF THE BRANCH ROM.  THE TEST
4035                                    ;EXECUTES EVERY POSSIBLE BRANCH WITH EVERY POSSIBLE CONDITION
4036                                    ;CODE COMBINATION.
4037                                    ;       THE ROUTINE USES TWO TABLES.  THE BRANCH TABLE HOLDS ALL THE
4038                                    ;POSSIBLE BRANCH INSTRUCTIONS, THE OTHER TABLE (YNTAB) HOLDS BIT MAPS FOR
4039                                    ;EACH BRANCH.  A ONE IN THE BIT MAP INDICATES THAT THE CORRESPONDING
4040                                    ;BRANCH INSTRUCTION SHOULD BRANCH FOR THE CONDITION CODE SETTING WHICH
4041                                    ;CORRESPONDS TO THE BIT POSITION WITHIN THE MAP.  FOR EXAMPLE IF THE LEFT
4042                                    ;MOST BIT IS A ONE THEN THE CORRESPONDING BRANCH INSTRUCTION SHOULD BRANCH
4043                                    ;WHEN THE CONDITION CODES ARE 0.
4044                                    ;       THE ROUTINE CONSISTS OF NESTED LOOPS; THE OUTER LOOP SETS UP
4045                                    ;ALL THE POSSIBLE BRANCH INSTRUCTIONS.  THE INNER LOOP SETS UP EVERY POSSIBLE
4046                                    ;CONDITION CODE FOR EACH BRANCH.
4047                                    ;       THE BIT MAP IS USED TO SET THE ADDRESS LOCATION IN TWO
4048                                    ;JUMP MODE 3 INSTRUCTIONS.  THE ADDRESSES ARE CHANGED TO ALLOW THE
4049                                    ;PROGRAM TO CONTINUE OR JUMP TO AN ERROR ROUTINE DEPENDING UPON
4050                                    ;WHETHER IT HANDLED THE BRANCH INSTRUCTION CORRECTLY.
4051                                    ;       AT ANY ERROR HALT, LOCATION, BRH, HOLDS THE BRANCH INSTRUCTION
4052                                    ;UNDER TEST AND LOCATION, CC, HOLDS THE VALUE OF THE CONDITION CODES
4053                                    ;AT THE TIME THE BRANCH WAS EXECUTED.
4054                                    ;
```

```
                                        .SBTTL  TEST # 241 - TEST THE BRANCH ROM
                                        ;*****************************************************************************
                                        ;TEST 241 - TEST THE BRANCH ROM
                                        ;*****************************************************************************
 026514  005212                 TST241: INC     (R2)            ;UPDATE TEST NUMBER
 026516  022712  000241                 CMP     #241,(R2)       ;SEQUENCE ERROR?
 026522  001062                         BNE     ER              ;BR TO ERROR HALT ON SEQ ERROR
4056 026524  012700  042154     SETUP: MOV     #BRTAB,R0       ;INITIALIZE BRANCH TABLE POINTER
4057 026530  012704  042230            MOV     #YNTAB,R4       ;INITIALIZE YES/NO BRANCH MAP POINTER
4058 026534  012767  000017  000146  MOV     #15.,BRCT       ;INITIALIZE BRANCH TABLE COUNT
4059 026542  012067  000110     SETBR: MOV     (R0)+,BRH       ;GET NEXT BRANCH INST.
4060 026546  012401                    MOV     (R4)+,R1        ;GET NEXT BRANCH MAP
4061 026550  012767  177777  000074  MOV     #-1,CC          ;INITIALIZE CONDITION CODE VALUE
4062 026556  012703  000020            MOV     #16.,R3         ;INITIALIZE CONDITION CODE COUNT
4063 026562  005267  000064     SETCC: INC     CC              ;SET FOR NEXT CC VALUE
4064 026566  032701  100000            BIT     #100000,R1      ;SEE IF SHOULD BR W/ THESE CC'S
4065 026572  013705  177776            MOV     @#177776,R5     ;SIMULATE A JNE
 026576  042705  177773                BIC     #177773,R5      ;       (JUMP NOT EQUAL)
 026602  000165  026606                JMP     .+4(R5)         ;       TO SET2BR
 026606  000167  000020                JMP     SET2BR
4066 026612  012767  026712  000042  MOV     #CONT,NBR       ;SET TO CONTINUE IF NO BRANCH
4067 026620  012767  026670  000040  MOV     #ER,YBR         ;SET TO REPORT ERROR IF BRANCH
4068 026626  000167  000014            JMP     AROUND          ;GO AROUND OPPOSITE CONDITION
4069 026632  012767  026670  000022  SET2BR: MOV    #ER,NBR         ;SET TO REPORT ERROR IF NO BRANCH
4070 026640  012767  026712  000020  MOV     #CONT,YBR       ;SET TO CONTINUE IF BRANCH
4071 026646  006101            AROUND: ROL     R1              ;UPDATE BIT MAP
4072
4073 026650  012737                    MOV     (PC)+,@(PC)+    ;SET CONDITION CODE
4074 026652  000000            CC:     0                       ;NEW CC VALUE GOES HERE
4075 026654  177776                    177776
4076 026656  000000            BRH:    0                       ;BRANCH INST. GOES HERE
4077 026660  000137                    JMP     @(PC)+          ;THIS JUMP IF NO BRANCH
4078 026662  000000            NBR:    0                       ;WHERE TO GO IF NO BRANCH OCCURS
4079 026664  000137                    JMP     @(PC)+          ;THIS JUMP IF BRANCH OCCURS
4080 026666  000000            YBR:    0                       ;WHERE TO GO IF BRANCH OCCURS
4081 026670  012702  000304    ER:     MOV     #$TESTN,R2      ;RESTORE POINTER
4082 026674  012762  000555  177776    MOV     #555,-2(R2)     ;MOVE TO MAILBOX #  *******  555  *******
 026702  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 026706  000000                        HALT                    ;
4083 026710  000000            BRCT:   0
4084 026712  005303            CONT:   DEC     R3              ;CC'S DONE?
4085 026714  013705  177776            MOV     @#177776,R5     ;SIMULATE A JNE
 026720  042705  177773                BIC     #177773,R5      ;       (JUMP NOT EQUAL)
 026724  000165  026730                JMP     .+4(R5)         ;       TO SETCC
 026730  000167  177626                JMP     SETCC
4086 026734  005367  177750            DEC     BRCT            ;BR'S DONE?
4087 026740  013705  177776            MOV     @#177776,R5     ;SIMULATE A JNE
 026744  042705  177773                BIC     #177773,R5      ;       (JUMP NOT EQUAL)
 026750  000165  026754                JMP     .+4(R5)         ;       TO SETBR
 026754  000167  177562                JMP     SETBR
4088
4089                                    ;*****************************************************************************
4090                                    ;
4091                                    ;THE FOLLOWING TEST VERIFIES THAT NO DUAL ADDRESSING OF THE GENERAL
4092                                    ;REGISTERS OCCURS. ALL REGISTERS ARE CLEARED, AND A UNIQUE BIT IS SET
4093                                    ;IN EACH. CMP INSTRUCTIONS CHECK THAT ONLY ONE BIT IS SET IN EACH
4094                                    ;REGISTER.
```

```
4095                                    ;
```

```
4096                                    .SBTTL  TEST # 242 - DUAL REGISTER ADDRESSING TEST
                                        ;*****************************************************************************
                                        ;TEST 242 - DUAL REGISTER ADDRESSING TEST
                                        ;*****************************************************************************
      026760  005212                    TST242: INC     (R2)            ;UPDATE TEST NUMBER
      026762  022712  000242                    CMP     #242,(R2)       ;SEQUENCE ERROR?
      026766  001052                            BNE     DAERR           ;BR TO ERROR HALT ON SEQ ERROR
4097  026770  005000                    BITCLR: CLR     R0              ;INITIALIZE ALL REGISTERS
4098  026772  005001                            CLR     R1
4099  026774  005002                            CLR     R2
4100  026776  005003                            CLR     R3
4101  027000  005004                            CLR     R4
4102  027002  005005                            CLR     R5
4103  027004  005006                            CLR     R6
4104  027006  052700  000001            BITSET: BIS     #1,R0           ;SET R0=1
4105  027012  052701  000002                    BIS     #2,R1           ;R1=2
4106  027016  052702  000004                    BIS     #4,R2           ;R2=4
4107  027022  052703  000010                    BIS     #10,R3          ;R3=10
4108  027026  052704  000020                    BIS     #20,R4          ;R4=20
4109  027032  052705  000040                    BIS     #40,R5          ;R5=40
4110  027036  052706  000100                    BIS     #100,R6         ;R6=100
4111  027042  022706  000100            BITCHK: CMP     #100,R6         ;TEST THAT NO DUAL ADDRESSING OCCURRED
4112  027046  001022                            BNE     DAERR           ;BR TO ERROR HALT IF ANY OTHER BITS ARE SET
4113  027050  022705  000040                    CMP     #40,R5
4114  027054  001017                            BNE     DAERR
4115  027056  022704  000020                    CMP     #20,R4
4116  027062  001014                            BNE     DAERR
4117  027064  022703  000010                    CMP     #10,R3
4118  027070  001011                            BNE     DAERR
4119  027072  022702  000004                    CMP     #4,R2
4120  027076  001006                            BNE     DAERR
4121  027100  022701  000002                    CMP     #2,R1
4122  027104  001003                            BNE     DAERR
4123  027106  022700  000001                    CMP     #1,R0
4124  027112  001406                            BEQ     BITCON
                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                        ;           WHICH FOLLOWS W/ 725           <====
      027114                            DAERR:
      027114  012762  000556  177776            MOV     #556,-2(R2)     ;MOVE TO MAILBOX #  *******  556  *******
      027122  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      027126  000000                            HALT                    ;DUAL ADDRESSING ERROR
4125  027130  012702  000304            BITCON: MOV     #$TESTN,R2      ;RESTORE POINTER
4126
4127                                    ;*****************************************************************************
4128                                    ;       THIS TEST VERIFIES THAT THE UPPER BYTE OF THE PSW IS NOT AFFECTED
4129                                    ;WHEN THE PRIORITY LEVEL OR CC'S ARE CHANGED. ALL BITS ARE
4130                                    ;INITIALLY SET IN THE PSW, AND THE LOW BYTE IS CLEARED. A BIT
4131                                    ;INSTRUCTION VERIFIES THE DATA.
4132                                    ;
```

```
                                        .SBTTL  TEST # 243 - TEST BYTE INSTRUCTION ON PSW
                                        ;*****************************************************************
                                        ;TEST 243 - TEST BYTE INSTRUCTION ON PSW
                                        ;*****************************************************************
 027134  005212                       TST243: INC     (R2)            ;UPDATE TEST NUMBER
 027136  022712  000243                       CMP     #243,(R2)       ;SEQUENCE ERROR?
 027142  001012                              BNE     BTERR           ;BR TO ERROR HALT ON SEQ ERROR
4134 027144  052737  170357  177776         BIS     #170357,@#PS    ;SET ALL POSSIBLE BITS IN PSW
4135 027152  105037  177776                 CLRB    @#PS            ;CLR PR LEVEL AND CC'S
4136 027156  013700  177776                 MOV     @#PS,R0         ;COPY CONTENTS OF PSW
4137 027162  032700  170000                 BIT     #170000,R0      ;TEST THAT UPPER BYTE IS UNAFFECTED
4138 027166  001010                         BNE     BTCON           ;CONTINUE IF OK
4139 027170  005037  177776           BTERR: CLR     @#PS            ;RETURN TO KERNEL MODE
4140 027174  012762  000557  177776         MOV     #557,-2(R2)     ;MOVE TO MAILBOX #  *******  557  *******
 027202  005262  177774                      INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 027206  000000                              HALT                    ;BYTE INSTRUCTION ALTERED PSW
4141 027210  005037  177776           BTCON: CLR     @#PS            ;RETURN TO KERNEL MODE
4142
4143                                    ;*****************************************************************
4144                                    ;
4145                                    ;       THIS TEST VERIFIES THAT A JMP INSTRUCTION DOES NOT ALTER THE
4146                                    ;CONDITION CODES IN THE PSW. THE CC'S ARE PRESET,THE JMP IS
4147                                    ;EXECUTED, AND CONDITIONAL BRANCHES VERIFY THE STATE OF THE CC'S.
4148                                    ;
```

```
4149                                    .SBTTL  TEST # 244 - TEST THAT JMP OPCODE DOES NOT AFFECT C.C.'S
                                        ;*****************************************************************************
                                        ;TEST 244 - TEST THAT JMP OPCODE DOES NOT AFFECT C.C.'S
                                        ;*****************************************************************************
027214  005212                        TST244: INC     (R2)            ;UPDATE TEST NUMBER
027216  022712  000244                        CMP     #244,(R2)       ;SEQUENCE ERROR?
027222  001012                                BNE     TST245-10       ;BR TO ERROR HALT ON SEQ ERROR
4150 027224  000277                         SCC
4151 027226  000252                         +CLN!CLV                ;CC=0101
4152 027230  000167  000000                 JMP     JMPT            ;JUMP TO TEST PSW
4153 027234  100403                 JMPT:  BMI     JMPERR          ;BR TO ERROR HALT IF N-BIT IS SET
4154 027236  001002                         BNE     JMPERR          ;BR TO ERROR HALT IF Z-BIT IS CLEAR
4155 027240  102401                         BVS     JMPERR          ;BR TO ERROR HALT IF V-BIT IF SET
4156 027242  103406                         BCS     TST245
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 767           <====
027244                                  JMPERR:
027244  012762  000560  177776                MOV     #560,-2(R2)     ;MOVE TO MAILBOX #  *******  560  *******
027252  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
027256  000000                                HALT                    ;JMP INSTRUCTION AFFECTED CC'S
                                                                    ;  OR SEQUENCE ERROR
4157                                    ;*****************************************************************************
4158                                    ;
4159                                    ;       THIS TEST VERIFIES THE SET AND CLEAR CONDITION CODE INSTRUCTIONS.
4160                                    ;THE TEST CONSISTS OF TWO ROUTINES, ONE TO TEST ALL CLEAR CC
4161                                    ;INSTRUCTIONS, AND THE SECOND TO TEST ALL SET CC INSTRUCTIONS. ALL
4162                                    ;POSSIBLE COMBINATIONS OF CONDITION CODES ARE TESTED, INCLUDING NOP'S.
4163                                    ;       TO TEST THE CLEAR CC INSTRUCTIONS, ALL CONDITION CODES ARE
4164                                    ;INITIALLY SET. THE INSTRUCTION IS EXECUTED, AND THE PSW IS CHECKED
4165                                    ;TO VERIFY THE PROPER COMBINATION OF CONDITION CODES.
4166                                    ;       TO TEST THE SET CC INSTRUCTIONS, THE CONDITION CODES ARE
4167                                    ;INITIALLY CLEARED, AND ONLY THE REQUIRED BITS ARE SET BY THE SET CC
4168                                    ;INSTRUCTION. THE CONTENTS OF THE PSW ARE CHECKED TO VERIFY THAT
4169                                    ;ONLY THE REQUIRED BITS WERE SET.
4170                                    ;
```

```
4171                                    .SBTTL  TEST # 245 - TEST SET CC AND CLEAR CC INSTRUCTIONS
                                        ;*************************************************************************
                                        ;TEST 245 - TEST SET CC AND CLEAR CC INSTRUCTIONS
                                        ;*************************************************************************
     027260  005212                     TST245: INC     (R2)            ;UPDATE TEST NUMBER
     027262  022712  000245                     CMP     #245,(R2)       ;SEQUENCE ERROR?
     027266  001064                             BNE     CCERR           ;BR TO ERROR HALT ON SEQ ERROR
4172 027270  012767  000240  000024             MOV     #240,CC1        ;INITIALIZE CLR CC INSTRUCTION CODES
4173 027276  012767  000017  000032             MOV     #17,CC2         ;INITIALIZE OCTAL MAP
4174 027304  012767  000261  000106             MOV     #261,SC3        ;INITIALIZE SET CC INSTRUCTION CODES
4175 027312  012767  000001  000114             MOV     #1,SC4          ;INITIALIZE OCTAL MAP
4176 027320  000277                     CLRCD:  SCC                     ;SET ALL CONDITION CODES
4177 027322  000000                     CC1:    0                       ;CONDITION CODE INSTRUCTION
4178 027324  013704  177776                     MOV     @#PS,R4         ;COPY THE PSW
4179 027330  042704  177760                     BIC     #177760,R4      ;ISOLATE CONDITION CODES
4180 027334  022704                             CMP     (PC)+,R4        ;CHECK THAT PROPER CC'S WERE CLEARED
4181 027336  000000                     CC2:    0                       ;OCTAL REPRESENTATION OF CC'S
4182 027340  001406                             BEQ     CON1
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 752           <====
     027342  012762  000561  177776             MOV     #561,-2(R2)     ;MOVE TO MAILBOX #  *******  561  *******
     027350  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     027354  000000                             HALT                    ;CLEAR CC INSTRUCTION FAILED
4183 027356  005367  177754             CON1:   DEC     CC2             ;SET NEXT OCTAL MAP OF CC'S
4184 027362  005267  177734                     INC     CC1             ;GET NEXT CLEAR CC INSTRUCTION
4185 027366  026727  177730  000257             CMP     CC1,#257        ;TEST FOR CCC INSTRUCTION
4186 027374  003751                             BLE     CLRCD           ;GO TEST NEXT INSTRUCTION IF NOT FOUND
4187 027376  026727  177720  000260             CMP     CC1,#260        ;CHECK FOR NOP=260
4188 027404  001004                             BNE     SETCD           ;GO TEST SET CC INSTRUCTIONS
4189 027406  012767  000017  177722             MOV     #17,CC2         ;SET OCTAL MAP TO TEST NOP
4190 027414  000741                             BR      CLRCD           ;GO TEST NOP
4191 027416  000257                     SETCD:  CCC                     ;CLEAR ALL CONDITION CODES
4192 027420  000000                     SC3:    0                       ;CONDITION CODE INSTRUCTION
4193 027422  013704  177776                     MOV     @#PS,R4         ;COY PSW
4194 027426  042704  177760                     BIC     #177760,R4      ;CLEAR AWAY UNWANTED BITS
4195 027432  022704                             CMP     (PC)+,R4        ;CHECK THAT PROPER CC'S WERE SET
4196 027434  000000                     SC4:    0                       ;OCTAL REPRESENTATION OF CC'S
4197 027436  001406                             BEQ     CON2
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 713           <====
     027440                             CCERR:
     027440  012762  000562  177776             MOV     #562,-2(R2)     ;MOVE TO MAILBOX #  *******  562  *******
     027446  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     027452  000000                             HALT                    ;SET CC FAILED OR SEQUENCE ERROR
4198 027454  005267  177754             CON2:   INC     SC4             ;SET NEXT OCTAL MAP
4199 027460  005267  177734                     INC     SC3             ;PREPARE NEXT SET CC INSTRUCTION
4200 027464  026727  177730  000277             CMP     SC3,#277        ;FINISHED?
4201 027472  003751                             BLE     SETCD           ;BR IF NO
4202
4203                                    ;*************************************************************************
4204                                    ;
4205                                    ;       THESE NEXT TWO TEST VERIFY MFPD AND MTPD INSTRUCTIONS
4206                                    ;WITH R6 IN MODE 0.
```

```
4207                                    ;
```

```
4208                                    .SBTTL  TEST # 246 - TEST MFPD WITH R6 IN MODE 0
                                        ;*****************************************************************************
                                        ;TEST 246 - TEST MFPD WITH R6 IN MODE 0
                                        ;*****************************************************************************
     027474  005212                     TST246: INC     (R2)            ;UPDATE TEST NUMBER
     027476  022712  000246                     CMP     #246,(R2)       ;SEQUENCE ERROR?
     027502  001036                             BNE     TST247-10       ;BR TO ERROR HALT ON SEQ ERROR
4209 027504  012706  001000                     MOV     #STBOT,R6               ;INITIALIZE KERNEL STACK POINTER
4210 027510  012767  140000  150260             MOV     #USRM,PS                ;SETUP USER MODE ,PREVIOUS KERNEL
4211 027516  012706  042402                     MOV     #USTBOT,R6              ;INITIALIZE USER STACK POINTER
4212 027522  106506                             MFPD    R6                      ;TRY MFPD WITH MODE 0
4213 027524  022767  140000  150244             CMP     #140000,PS              ;CHECK PSW
4214 027532  001411                             BEQ     MFPD0                   ;BR IF NO ERROR
4215 027534  042767  140000  150234             BIC     #USRM,PS                ;CLEAR USER MODE
4216 027542  012762  000563  177776             MOV     #563,-2(R2)     ;MOVE TO MAILBOX #  *******  563  *******
     027550  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     027554  000000                             HALT                    ;INCORRECT PSW FROM MFPD
4217 027556  022767  001000  012614  MFPD0:     CMP     #STBOT,USTBOT-2         ;CHECK DATA ON STACK
4218 027564  001411                             BEQ     MFPD0A                  ;BR IF NO ERROR
4219 027566  042767  140000  150202             BIC     #USRM,PS                ;CLEAR USER MODE
4220 027574  012762  000564  177776             MOV     #564,-2(R2)     ;MOVE TO MAILBOX #  *******  564  *******
     027602  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     027606  000000                             HALT                    ;INCORRECT DATA FROM MFPD
4221 027610                             MFPD0A:
4222
```

```
4223                                    .SBTTL  TEST # 247 - TEST MTPD WITH R6 IN MODE 0
                                        ;*****************************************************************************
                                        ;TEST 247 - TEST MTPD WITH R6 IN MODE 0
                                        ;*****************************************************************************
     027610  005212                    TST247: INC     (R2)            ;UPDATE TEST NUMBER
     027612  022712  000247                    CMP     #247,(R2)       ;SEQUENCE ERROR?
     027616  001035                            BNE     TST250-10       ;BR TO ERROR HALT ON SEQ ERROR
4224 027620  005067  150152                    CLR     PS                      ;SET KERNEL MODE
4225 027624  005006                            CLR     R6                      ;INITIALIZE KERNEL R6
4226 027626  012767  140000  150142            MOV     #USRM,PS                ;SET USER MODE/PREVIOUS KERNEL
4227 027634  012746  001000                    MOV     #STBOT,-(R6)            ;SET UP TARGET DATA
4228 027640  106606                            MTPD    R6                      ;TRY MODE 0 MTPD
4229 027642  022767  140000  150126            CMP     #USRM,PS                ;CHECK PSW
4230 027650  001411                            BEQ     MTPD0                   ;BR IF NO ERROR
4231 027652  042767  140000  150116            BIC     #USRM,PS                ;CLEAR USER MODE
4232 027660  012762  000565  177776            MOV     #565,-2(R2)     ;MOVE TO MAILBOX #  *******  565  *******
     027666  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     027672  000000                            HALT                    ;PS INCORRECT FOLLOWING MTPD
4233 027674  005067  150076            MTPD0:  CLR     PS                      ;SET KERNEL MODE
4234 027700  020627  001000                    CMP     R6,#STBOT               ;CHECK TARGET DATA
4235 027704  001406                            BEQ     TST250
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 744           <====
     027706  012762  000566  177776            MOV     #566,-2(R2)     ;MOVE TO MAILBOX #  *******  566  *******
     027714  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     027720  000000                            HALT                    ;DATA INCORRECT FOLLOWING MTPD
                                                                        ;  OR SEQUENCE ERROR
4236
4237                                    ;*****************************************************************************
```

```
4238                                    .SBTTL  TEST # 250 - TEST MFPT INSTRUCTION
                                        ;*************************************************************************************
                                        ;TEST 250 - TEST MFPT INSTRUCTION
                                        ;*************************************************************************************
                                        ;
027722  005212                          TST250: INC     (R2)            ;UPDATE TEST NUMBER
027724  022712  000250                          CMP     #250,(R2)       ;SEQUENCE ERROR?
027730  001007                                  BNE     TST251-10       ;BR TO ERROR HALT ON SEQ ERROR
4239 027732  005000                            CLR     R0                      ;SET UP R0
4240 027734  000007                            MFPT                    ;MOVE FROM PROCSSOR TYPE
4241 027736  122700  000001                    CMPB    #1,R0                   ;CHECK FOR A ONE IN R0
4242 027742  001406                            BEQ     TST251
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 772           <====
027744  012762  000567  177776                MOV     #567,-2(R2)     ;MOVE TO MAILBOX #  *******  567  *******
027752  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
027756  000000                              HALT                      ;MFPT FAILED TO RETURN A 1,IN R0
                                                                        ;  OR SEQUENCE ERROR
4243
4244                                    ;*************************************************************************************
4245
4246                                    ;
4247                                            .SBTTL BIT TEST OF PIRQ REGISTER
4248                                    ;A COUNT PATTERN IS THEN RUN THRU THE REGISTER TO ENSURE THAT
4249                                    ;THE ENCODER FUNCTIONS PROPERLY.
4250                                    ;
```

TEST # 251 - BIT TEST OF PIRQ REGISTER

```
4251                                    .SBTTL  TEST # 251 - BIT TEST OF PIRQ REGISTER
                                        ;*****************************************************************************
                                        ;TEST 251 - BIT TEST OF PIRQ REGISTER
                                        ;*****************************************************************************
 027760  005212                       TST251: INC     (R2)            ;UPDATE TEST NUMBER
 027762  022712  000251                       CMP     #251,(R2)       ;SEQUENCE ERROR?
 027766  001066                               BNE     TST252-10       ;BR TO ERROR HALT ON SEQ ERROR
4252 027770  012706  001000                   MOV     #STBOT,SP               ;INITIALIZE THE SP
4253 027774  012767  030010  012222           MOV     #4$,$LPADR              ;SETUP LOOP ADR
4254 030002  012767  030010  012216           MOV     #4$,$LPERR              ;SETUP ERROR LOOP
4255 030010  052737  000340  177776  4$:      BIS     #340,@#177776                   ;SET THE CPU PRIORITY AT 7.
4256 030016  005067  012170                   CLR     $TMP0                   ;SETUP COMPARISON LOCATION
4257 030022  005037  177772                   CLR     @#PIRQ                  ;CLEAR PIRQ REGISTER
4258 030026  026737  012160  177772           CMP     $TMP0,@#PIRQ            ;DID PIRQ CLEAR
4259 030034  001035                           BNE     1$                      ;BRANCH IF NO
4260 030036  012700  000177                   MOV     #177,R0                 ;SETUP ITTERATION COUNT
4261 030042  012767  001042  012142           MOV     #1042,$TMP0             ;SETUP COMPARISON LOCATION
4262 030050  012701  000002                   MOV     #2,R1                   ;SETUP R1
4263 030054  062737  001000  177772  2$:      ADD     #1000,@#PIRQ            ;START COUNT PATTERN
4264 030062  026737  012124  177772           CMP     $TMP0,@#PIRQ            ;DID REGISTER SET CORRECT?
4265 030070  001017                           BNE     1$                      ;BRANCH IF NO
4266 030072  120137  177773                   CMPB    R1,@#PIRQ+1             ;IS PIRQ READY TO GO TO NEXT LEVEL?
4267 030076  001005                           BNE     3$                      ;BRANCH IF NO
4268 030100  062767  000042  012104           ADD     #42,$TMP0               ;INCREMENT ENCODED VALUE IN TEST LOC.
4269 030106  005201                           INC     R1                      ;SETUP R1 FOR ROTATE
4270 030110  006101                           ROL     R1                      ;SET R1 TO NEXT CHECK LEVEL
4271 030112  062767  001000  012072  3$:      ADD     #1000,$TMP0             ;INC. PIRQ LEVEL IN TEST LOCATION
4272 030120  077023                           SOB     R0,2$                   ;CONTINUE COUNT
4273 030122  005037  177772                   CLR     @#PIRQ                  ;ENSURE PIRQ CLEAR
4274 030126  000412                           BR      EIS             ;GO TO NEXT TEST
4275 030130  013767  177772  012064  1$:      MOV     @#PIRQ,$EPIRQ           ;SAVE PIRQ FOR ERROR CHECKING
4276 030136  001406                           BEQ     TST252
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS    <====
                                                                       ;           CONDITIONAL BRANCH INST. AND    <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION    <====
                                                                       ;           WHICH FOLLOWS W/ 713            <====
 030140  012762  000570  177776                MOV     #570,-2(R2)     ;MOVE TO MAILBOX #  *******  570  *******
 030146  005262  177774                       INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 030152  000000                               HALT                    ;PIRQ REG. FAILED
                                                                       ;  OR SEQUENCE ERROR
4277 030154                             EIS:
4278                                    .SBTTL EIS ASH/ASCH/MUL/DIV TESTS
4279                                            ;ASH SHIFTING RIGHT USING DM2 REG 7
4280                                            ;SHIFT RIGHT CLEAR N-BIT AND C-BIT
4281                                            ;MODE 2-REG 7
```

```
4282                                    .SBTTL  TEST # 252 - ASH 40000 SHIFTED BY 177765=10 PS=0
                                        ;*****************************************************************************
                                        ;TEST 252 - ASH 40000 SHIFTED BY 177765=10 PS=0
                                        ;*****************************************************************************
030154  005212                  TST252: INC     (R2)            ;UPDATE TEST NUMBER
030156  022712  000252                  CMP     #252,(R2)       ;SEQUENCE ERROR?
030162  001032                          BNE     TST253-10       ;BR TO ERROR HALT ON SEQ ERROR
4283 030164  012706  001000            MOV     #STBOT,R6
4284 030170  005037  177776            CLR     @#PS
4285 030174  012700  040000            MOV     #40000,R0       ;LOAD R0 WITH 40000
4286 030200  072027  177765            ASH     #177765,R0      ;SHIFT R0 BY 177765
4287 030204  013767  177776  012330    MOV     @#PS,SPSW       ;SAVE PS
4288 030212  122767  000000  012322    CMPB    #0,SPSW         ;IS THE PS 0?
4289 030220  001406                    BEQ     1$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 760           <====
030222  012762  000571  177776          MOV     #571,-2(R2)     ;MOVE TO MAILBOX #  *******  571  *******
030230  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
030234  000000                          HALT                    ;THE PS IS NOT EQUAL TO 0
4290 030236  022700  000010      1$:    CMP     #10,R0          ;IS THE RESULT 10?
4291 030242  001406                    BEQ     TST253
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 747           <====
030244  012762  000572  177776          MOV     #572,-2(R2)     ;MOVE TO MAILBOX #  *******  572  *******
030252  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
030256  000000                          HALT                    ;R0 IS NOT EQUAL TO 10
                                                                ;  OR SEQUENCE ERROR
4292
4293                                    ;SHIFT RIGHT SET N-BIT CLEAR C-BIT
4294                                    ;MODE 2 /REG 7
```

```
4295                                    .SBTTL  TEST # 253 - ASH 125252 SHIFTED BY -2=165252 PS=11
                                        ;*****************************************************************************
                                        ;TEST 253 - ASH 125252 SHIFTED BY -2=165252 PS=11
                                        ;*****************************************************************************
     030260  005212                     TST253: INC     (R2)            ;UPDATE TEST NUMBER
     030262  022712  000253                     CMP     #253,(R2)       ;SEQUENCE ERROR?
     030266  001026                             BNE     TST254-10       ;BR TO ERROR HALT ON SEQ ERROR
4296 030270  012700  125252                     MOV     #125252,R0      ;LOAD R0 WITH 125252
4297 030274  072027  177776                     ASH     #-2,R0          ;SHIFT R0 BY -2
4298 030300  013767  177776  012234             MOV     @#PS,SPSW       ;SAVE PS
4299 030306  122767  000011  012226             CMPB    #11,SPSW                ;IS THE PS 11?
4300 030314  001406                             BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
     030316  012762  000573  177776             MOV     #573,-2(R2)     ;MOVE TO MAILBOX #  *******  573  *******
     030324  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     030330  000000                             HALT                    ;THE PS IS NOT EQUAL TO 11
4301 030332  022700  165252             1$:     CMP     #165252,R0      ;IS THE RESULT 165252?
4302 030336  001406                             BEQ     TST254
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 753           <====
     030340  012762  000574  177776             MOV     #574,-2(R2)     ;MOVE TO MAILBOX #  *******  574  *******
     030346  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     030352  000000                             HALT                    ;R0 IS NOT EQUAL TO 165252
                                                                        ;  OR SEQUENCE ERROR
4303
4304                                    ;SHIFT RIGHT CLEAR N-BIT SET Z-BIT
4305                                    ;MODE 2 /REG 7
```

```
4306                                    .SBTTL  TEST # 254 - ASH 0 SHIFTED BY -16. =0 PS=4
                                        ;*************************************************************************
                                        ;TEST 254 - ASH 0 SHIFTED BY -16. =0 PS=4
                                        ;*************************************************************************
      030354  005212                    TST254: INC     (R2)            ;UPDATE TEST NUMBER
      030356  022712  000254                    CMP     #254,(R2)       ;SEQUENCE ERROR?
      030362  001026                            BNE     TST255-10       ;BR TO ERROR HALT ON SEQ ERROR
4307  030364  012700  000000                    MOV     #0,R0           ;LOAD R0 WITH 0
4308  030370  072027  177760                    ASH     #-16.,R0        ;SHIFT R0 BY -16.
4309  030374  013767  177776  012140            MOV     @#PS,SPSW       ;SAVE PS
4310  030402  122767  000004  012132            CMPB    #4,SPSW         ;IS THE PS 4?
4311  030410  001406                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
      030412  012762  000575  177776            MOV     #575,-2(R2)     ;MOVE TO MAILBOX #  *******  575  *******
      030420  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      030424  000000                            HALT                    ;THE PS IS NOT EQUAL TO 4
4312  030426  022700  000000            1$:     CMP     #0,R0           ;IS THE RESULT 0?
4313  030432  001406                            BEQ     TST255
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 753           <====
      030434  012762  000576  177776            MOV     #576,-2(R2)     ;MOVE TO MAILBOX #  *******  576  *******
      030442  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      030446  000000                            HALT                    ;R0 IS NOT EQUAL TO 0
                                                                        ;  OR SEQUENCE ERROR
4314
4315                                    .SBTTL ASH SHIFTING LEFT STORE ASH DM2 REG 7
4316                                            ;SHIFT LEFT SET C-BIT=0 STORE ASH
4317                                            ;MODE 2 /REG 7
```

```
                                        .SBTTL  TEST # 255 - ASH 0 SHIFTED BY 0=0 PS=4
                                        ;*****************************************************************************
                                        ;TEST 255 - ASH 0 SHIFTED BY 0=0 PS=4
                                        ;*****************************************************************************
 030450  005212                        TST255: INC     (R2)            ;UPDATE TEST NUMBER
 030452  022712  000255                        CMP     #255,(R2)       ;SEQUENCE ERROR?
 030456  001026                                BNE     TST256-10       ;BR TO ERROR HALT ON SEQ ERROR
4319 030460  012700  000000                    MOV     #0,R0           ;LOAD R0 WITH 0
4320 030464  072027  000000                    ASH     #0,R0           ;SHIFT R0 BY 0
4321 030470  013767  177776  012044            MOV     @#PS,SPSW       ;SAVE PS
4322 030476  122767  000004  012036            CMPB    #4,SPSW         ;IS THE PS 4?
4323 030504  001406                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
 030506  012762  000577  177776                MOV     #577,-2(R2)     ;MOVE TO MAILBOX #  *******  577  *******
 030514  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 030520  000000                                HALT                    ;THE PS IS NOT EQUAL TO 4
4324 030522  022700  000000            1$:     CMP     #0,R0           ;IS THE RESULT 0?
4325 030526  001406                            BEQ     TST256
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 753           <====
 030530  012762  000600  177776                MOV     #600,-2(R2)     ;MOVE TO MAILBOX #  *******  600  *******
 030536  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 030542  000000                                HALT                    ;R0 IS NOT EQUAL TO 0
                                                                        ;  OR SEQUENCE ERROR

4326
4327
4328                                                    .SBTTL ASH SHIFTING LEFT DM6 REG 7
4329                                                            ;SHIFT LEFT SET C-BIT=1
4330                                                            ;MODE 6 /REG 7
```

```
4331                                    .SBTTL  TEST # 256 - ASH 125252 SHIFTED BY S1=125250 PS=12
                                        ;*****************************************************************************
                                        ;TEST 256 - ASH 125252 SHIFTED BY S1=125250 PS=12
                                        ;*****************************************************************************
      030544  005212                    TST256: INC     (R2)            ;UPDATE TEST NUMBER
      030546  022712  000256                    CMP     #256,(R2)       ;SEQUENCE ERROR?
      030552  001030                            BNE     TST257-10       ;BR TO ERROR HALT ON SEQ ERROR
4332  030554  012700  125252                    MOV     #125252,R0      ;LOAD R0 WITH 125252
4333  030560  012704  042550                    MOV     #S1,R4          ;SET UP R4
4334  030564  072067  011760                    ASH     S1,R0           ;SHIFT R0 BY S1
4335  030570  013767  177776  011744            MOV     @#PS,SPSW       ;SAVE PS
4336  030576  122767  000012  011736            CMPB    #12,SPSW                ;IS THE PS 12?
4337  030604  001406                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 762           <====
      030606  012762  000601  177776            MOV     #601,-2(R2)     ;MOVE TO MAILBOX #  *******  601  *******
      030614  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      030620  000000                            HALT                    ;THE PS IS NOT EQUAL TO 12
4338  030622  022700  125250            1$:     CMP     #125250,R0      ;IS THE RESULT 125250?
4339  030626  001406                            BEQ     TST257
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 751           <====
      030630  012762  000602  177776            MOV     #602,-2(R2)     ;MOVE TO MAILBOX #  *******  602  *******
      030636  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      030642  000000                            HALT                    ;R0 IS NOT EQUAL TO 177525
                                                                        ;  OR SEQUENCE ERROR
4340
4341                                    .SBTTL ASH SHIFTING LEFT TEST SIGN Z-BIT DM7 REG 7
4342                                            ;SHIFT LEFT COUNT DOWN TO ZERO TEST SIGN Z-BIT
4343                                            ;MODE 7 /REG 7
```

```
4344                                    .SBTTL  TEST # 257 - ASH 125252 SHIFTED BY @S2= 177525 PS=10
                                        ;*****************************************************************************
                                        ;TEST 257 - ASH 125252 SHIFTED BY @S2= 177525 PS=10
                                        ;*****************************************************************************
                                        TST257: INC     (R2)            ;UPDATE TEST NUMBER
     030644  005212                             CMP     #257,(R2)       ;SEQUENCE ERROR?
     030646  022712  000257                     BNE     TST260-10       ;BR TO ERROR HALT ON SEQ ERROR
     030652  001030
4345 030654  012700  125252                     MOV     #125252,R0      ;LOAD R0 WITH 125252
4346 030660  012703  042556                     MOV     #S4,R3          ;SET UP R3
4347 030664  072077  011666                     ASH     @S4,R0          ;SHIFT R0 BY @S2
4348 030670  013767  177776  011644             MOV     @#PS,SPSW       ;SAVE PS
4349 030676  122767  000010  011636             CMPB    #10,SPSW                ;IS THE PS 10?
4350 030704  001406                             BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 762           <====
     030706  012762  000603  177776             MOV     #603,-2(R2)     ;MOVE TO MAILBOX #  *******  603  *******
     030714  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     030720  000000                             HALT                    ;THE PS IS NOT EQUAL TO 10
4351 030722  022700  177525             1$:     CMP     #177525,R0      ;IS RESULT 177525?
4352 030726  001406                             BEQ     TST260
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 751           <====
     030730  012762  000604  177776             MOV     #604,-2(R2)     ;MOVE TO MAILBOX #  *******  604  *******
     030736  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     030742  000000                             HALT                    ;R0 IS NOT EQUAL TO 177525
                                                                        ;  OR SEQUENCE ERROR
4353
4354                                    .SBTTL ASH SHIFTING LEFT TESTING IR9 FOR ASH/ASHC DM3 REG 7
4355                                            ;SHIFT LEFT TEST IR9 TO DETERMINE ASH/ASHC
4356                                            ;MODE 3 /REG 7
```

```
4357                                    .SBTTL  TEST # 260 - ASH 125252 SHIFTED BY @#S1=177525 PS=10
                                        ;*****************************************************************************
                                        ;TEST 260 - ASH 125252 SHIFTED BY @#S1=177525 PS=10
                                        ;*****************************************************************************
      030744  005212                    TST260: INC     (R2)            ;UPDATE TEST NUMBER
      030746  022712  000260                    CMP     #260,(R2)       ;SEQUENCE ERROR?
      030752  001030                            BNE     TST261-10       ;BR TO ERROR HALT ON SEQ ERROR
4358  030754  012700  125252                    MOV     #125252,R0      ;LOAD R0 WITH 125252
4359  030760  012704  042554                    MOV     #S3,R4          ;SET UP R4
4360  030764  072037  042554                    ASH     @#S3,R0         ;SHIFT R0 BY @#S1
4361  030770  013767  177776  011544           MOV     @#PS,SPSW       ;SAVE PS
4362  030776  122767  000010  011536           CMPB    #10,SPSW                ;IS THE PS 10?
4363  031004  001406                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 762           <====
      031006  012762  000605  177776           MOV     #605,-2(R2)     ;MOVE TO MAILBOX #  *******  605  *******
      031014  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      031020  000000                            HALT                    ;THE PS IS NOT EQUAL TO 10
4364  031022  022700  177525          1$:       CMP     #177525,R0      ;IS THE RESULT 177525?
4365  031026  001406                            BEQ     TST261
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 751           <====
      031030  012762  000606  177776           MOV     #606,-2(R2)     ;MOVE TO MAILBOX #  *******  606  *******
      031036  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      031042  000000                            HALT                    ;R0 IS NOT EQUAL TO 177525
                                                                        ;  OR SEQUENCE ERROR
4366
4367                                    .SBTTL ASH SHIFTING LEFT USING DM6 REG 7
4368                                            ;SHIFT LEFT TEST R17 TO DETERMINE C-BIT
4369                                            ;CLEAR BX TO INDICATE C-BIT=0
4370                                            ;MODE 6 /REG 7
4371
```

```
4372                                    .SBTTL  TEST # 261 - ASH 025252 SHIFTED S1=125250 PS=12
                                        ;*****************************************************************************
                                        ;TEST 261 - ASH 025252 SHIFTED S1=125250 PS=12
                                        ;*****************************************************************************
      031044  005212                    TST261: INC     (R2)            ;UPDATE TEST NUMBER
      031046  022712  000261                    CMP     #261,(R2)       ;SEQUENCE ERROR?
      031052  001030                            BNE     TST262-10       ;BR TO ERROR HALT ON SEQ ERROR
4373  031054  012700  025252                    MOV     #025252,R0      ;LOAD R0 WITH 025252
4374  031060  012704  042550                    MOV     #S1,R4          ;SET UP R4
4375  031064  072067  011460                    ASH     S1,R0           ;SHIFT R0 BY S1
4376  031070  013767  177776  011444            MOV     @#PS,SPSW       ;SAVE PS
4377  031076  122767  000012  011436            CMPB    #12,SPSW                ;IS THE PS 10?
4378  031104  001406                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 762           <====
      031106  012762  000607  177776            MOV     #607,-2(R2)     ;MOVE TO MAILBOX #  *******  607  *******
      031114  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      031120  000000                            HALT                    ;THE PS IS NOT EQUAL TO 10
4379  031122  022700  125250            1$:     CMP     #125250,R0      ;IS THE RESULT 125250
4380  031126  001406                            BEQ     TST262
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 751           <====
      031130  012762  000610  177776            MOV     #610,-2(R2)     ;MOVE TO MAILBOX #  *******  610  *******
      031136  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      031142  000000                            HALT                    ;R0 IS NOT EQUAL TO 077525
                                                                        ;  OR SEQUENCE ERROR

4381
4382
4383
4384                                                    .SBTTL ASHC SHIFTING POS.USING DMO REG 2
4385                                                        ;MODE 0 REG 4
```

```
4386                                    .SBTTL  TEST # 262 - ASHC 125252,125252,SHIF BY R4=177525 52525 PS=10
                                        ;*****************************************************************************
                                        ;TEST 262 - ASHC 125252,125252,SHIF BY R4=177525 52525 PS=10
                                        ;*****************************************************************************
                                        ;
031144  005212                  TST262: INC     (R2)            ;UPDATE TEST NUMBER
031146  022712  000262                  CMP     #262,(R2)       ;SEQUENCE ERROR?
031152  001043                          BNE     TST263-10       ;BR TO ERROR HALT ON SEQ ERROR
4387 031154  012700  125252            MOV     #125252 ,R0     ;LOAD R0 WITH 125252
4388 031160  012701  125252            MOV     #125252,R1      ;LOAD R0!1 WITH 125252
4389 031164  000241                    CLC
4390 031166  012704  177771            MOV     #-7,R4          ;SET UP R4
4391 031172  073004                    ASHC    R4,R0           ;SHIFT R0,R0!1 BY R4
4392 031174  013767  177776  011340    MOV     @#PS,SPSW       ;SAVE PS
4393 031202  122767  000010  011332    CMPB    #10,SPSW                ;IS THE PS 10?
4394 031210  001406                    BEQ     1$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 760           <====
031212  012762  000611  177776            MOV     #611,-2(R2)     ;MOVE TO MAILBOX #  *******  611  *******
031220  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
031224  000000                          HALT                    ;THE PS IS NOT EQUAL TO 10
4395 031226  022700  177525      1$:   CMP     #177525,R0      ;IS RESULT 177525?
4396 031232  001406                    BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 747           <====
031234  012762  000612  177776            MOV     #612,-2(R2)     ;MOVE TO MAILBOX #  *******  612  *******
031242  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
031246  000000                          HALT                    ;R0 IS NOT EQUAL TO 177525
4397 031250  022701  052525      2$:   CMP     #52525,R1       ;IS THE RESULT 52525?
4398 031254  001406                    BEQ     TST263
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 736           <====
031256  012762  000613  177776            MOV     #613,-2(R2)     ;MOVE TO MAILBOX #  *******  613  *******
031264  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
031270  000000                          HALT                    ;R1 IS NOT EQUAL TO 52525
                                                                ;  OR SEQUENCE ERROR
4399                                    .SBTTL ASHC SHIFTING NEG. USING DM4 REG 3
4400
4401                                            ;MODE 4 REG 3
```

```
4402                                    .SBTTL  TEST # 263 - ASHC 125252,125252,SHIF,-(3)=177525,52525 PS=10
                                        ;*****************************************************************************
                                        ;TEST 263 - ASHC 125252,125252,SHIF,-(3)=177525,52525 PS=10
                                        ;*****************************************************************************
031272  005212                  TST263: INC     (R2)            ;UPDATE TEST NUMBER
031274  022712  000263                  CMP     #263,(R2)       ;SEQUENCE ERROR?
031300  001043                          BNE     TST264-10       ;BR TO ERROR HALT ON SEQ ERROR
4403 031302  012700  125252            MOV     #125252,R0      ;LOAD R0 WITH 125252
4404 031306  012701  125252            MOV     #125252,R1      ;LOAD R0!1 WITH 125252
4405 031312  000241                    CLC
4406 031314  012703  042556            MOV     #S3+2,R3        ;SET UP R3
4407 031320  073043                    ASHC    -(R3),R0                ;SHIFT R0,R0!1 BY -(3)
4408 031322  013767  177776  011212    MOV     @#PS,SPSW       ;SAVE PS
4409 031330  122767  000010  011204    CMPB    #10,SPSW                ;IS THE PS 10?
4410 031336  001406                    BEQ     1$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 760           <====
031340  012762  000614  177776          MOV     #614,-2(R2)     ;MOVE TO MAILBOX #  *******  614  *******
031346  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
031352  000000                          HALT                    ;THE PS IS NOT EQUAL TO 10
4411 031354  022700  177525      1$:   CMP     #177525,R0      ;IS THE RESULT 177525
4412 031360  001406                    BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 747           <====
031362  012762  000615  177776          MOV     #615,-2(R2)     ;MOVE TO MAILBOX #  *******  615  *******
031370  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
031374  000000                          HALT                    ;R0 IS NOT EQUAL TO 177252
4413 031376  022701  052525      2$:   CMP     #52525,R1       ;IS THE RESULT 52525?
4414 031402  001406                    BEQ     TST264
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 736           <====
031404  012762  000616  177776          MOV     #616,-2(R2)     ;MOVE TO MAILBOX #  *******  616  *******
031412  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
031416  000000                          HALT                    ;R0!1 IS NOT EQUAL TO 52525
                                                                ;  OR SEQUENCE ERROR
4415
4416                                    .SBTTL ASHC SHIFTED BY @-(4) DM5 REG 4
4417                                            ;MODE 5 REG 4
```

```
4418                                    .SBTTL  TEST # 264 - ASHC 125252 SHIFTED BY @-(4)=177525 52525 PS=10
                                        ;*****************************************************************************
                                        ;TEST 264 - ASHC 125252 SHIFTED BY @-(4)=177525 52525 PS=10
                                        ;*****************************************************************************
031420  005212                  TST264: INC     (R2)            ;UPDATE TEST NUMBER
031422  022712  000264                  CMP     #264,(R2)       ;SEQUENCE ERROR?
031426  001043                          BNE     TST265-10       ;BR TO ERROR HALT ON SEQ ERROR
4419 031430  012700  125252            MOV     #125252,R0      ;LOAD R0 WITH 125252
4420 031434  012701  125252            MOV     #125252,R1      ;LOAD R0!1 WITH 125252
4421 031440  000241                    CLC
4422 031442  012704  042560            MOV     #S4+2,R4                ;SET UP R4
4423 031446  073054                    ASHC    @-(R4),R0       ;SHIFT R0,!1 BY @-(4)
4424 031450  013767  177776  011064    MOV     @#PS,SPSW       ;SAVE PS
4425 031456  122767  000010  011056    CMPB    #10,SPSW                ;IS THE PS 10?
4426 031464  001406                    BEQ     1$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 760           <====
031466  012762  000617  177776            MOV     #617,-2(R2)     ;MOVE TO MAILBOX #  *******  617  *******
031474  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
031500  000000                          HALT                    ;THE PS IS NOT EQUAL TO 10
4427 031502  022700  177525      1$:   CMP     #177525,R0      ;IS THE RESULT 177525?
4428 031506  001406                    BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 747           <====
031510  012762  000620  177776            MOV     #620,-2(R2)     ;MOVE TO MAILBOX #  *******  620  *******
031516  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
031522  000000                          HALT                    ;R0 IS NOT EQUAL TO 177525
4429 031524  022701  052525      2$:   CMP     #52525,R1       ;IS THE RESULT 52525?
4430 031530  001406                    BEQ     TST265
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 736           <====
031532  012762  000621  177776            MOV     #621,-2(R2)     ;MOVE TO MAILBOX #  *******  621  *******
031540  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
031544  000000                          HALT                    ;R0!1 IS NOT EQUAL TO 52525
                                                                ;  OR SEQUENCE ERROR
4431
4432                                    .SBTTL ASHC SHIFTED BY @(4) DM7 REG 4
4433                                            ;MODE 7 REG 4
```

```
4434                                    .SBTTL  TEST # 265 - ASHC 1252552,125252,SHIF,@(4)=177525,52525 PS=10
                                        ;*****************************************************************************
                                        ;TEST 265 - ASHC 1252552,125252,SHIF,@(4)=177525,52525 PS=10
                                        ;*****************************************************************************
031546  005212                  TST265: INC     (R2)            ;UPDATE TEST NUMBER
031550  022712  000265                  CMP     #265,(R2)       ;SEQUENCE ERROR?
031554  001044                          BNE     TST266-10       ;BR TO ERROR HALT ON SEQ ERROR
4435 031556  012700  125252            MOV     #125252,R0      ;LOAD R0 WITH 125252
4436 031562  012701  125252            MOV     #125252,R1      ;LOAD R0!1 WITH 125252
4437 031566  000241                    CLC
4438 031570  012704  042556            MOV     #S4,R4          ;SET UP R4
4439 031574  073074  000000            ASHC    @(R4),R0                ;SHIFT R0,R0!1 BY @(4)
4440 031600  013767  177776  010734    MOV     @#PS,SPSW       ;SAVE PS
4441 031606  122767  000010  010726    CMPB    #10,SPSW                ;IS THE PS 10?
4442 031614  001406                    BEQ     1$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 757           <====
031616  012762  000622  177776            MOV     #622,-2(R2)     ;MOVE TO MAILBOX #  *******  622  *******
031624  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
031630  000000                          HALT                    ;THE PS IS NOT EQUAL TO 10
4443 031632  022700  177525    1$:     CMP     #177525,R0      ;IS THE RESULT 177525?
4444 031636  001406                    BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 746           <====
031640  012762  000623  177776            MOV     #623,-2(R2)     ;MOVE TO MAILBOX #  *******  623  *******
031646  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
031652  000000                          HALT                    ;R0 IS NOT EQUAL TO 177525
4445 031654  022701  052525    2$:     CMP     #52525,R1       ;IS THE RESULT 52525?
4446 031660  001406                    BEQ     TST266
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 735           <====
031662  012762  000624  177776            MOV     #624,-2(R2)     ;MOVE TO MAILBOX #  *******  624  *******
031670  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
031674  000000                          HALT                    ;R0!1 IS NOT EQUAL TO 52525
                                                                ;  OR SEQUENCE ERROR
4447
4448                                    .SBTTL ASHC SHIFTED BY -32. DM2 REG 7
4449                                            ;MODE 2 REG 7
```

```
4450                                    .SBTTL  TEST # 266 - ASHC 100000 0 SHIFTED BY -32.=-1 -1 PS=11
                                        ;*****************************************************************************
                                        ;TEST 266 - ASHC 100000 0 SHIFTED BY -32.=-1 -1 PS=11
                                        ;*****************************************************************************
031676  005212                  TST266: INC     (R2)            ;UPDATE TEST NUMBER
031700  022712  000266                  CMP     #266,(R2)       ;SEQUENCE ERROR?
031704  001042                          BNE     TST267-10       ;BR TO ERROR HALT ON SEQ ERROR
4451 031706  012700  100000            MOV     #100000,R0      ;LOAD R0 WITH 100000
4452 031712  012701  000000            MOV     #0,R1           ;LOAD R0!1 WITH 0
4453 031716  000241                    CLC
4454 031720  073027  177740            ASHC    #-32.,R0        ;SHIFT R0,R0!1 BY -32.
4455 031724  013767  177776  010610    MOV     @#PS,SPSW       ;SAVE PS
4456 031732  122767  000011  010602    CMPB    #11,SPSW                ;IS THE PS 11?
4457 031740  001406                    BEQ     1$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 761           <====
031742  012762  000625  177776          MOV     #625,-2(R2)     ;MOVE TO MAILBOX #  *******  625  *******
031750  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
031754  000000                          HALT                    ;THE PS IS NOT EQUAL TO 11
4458 031756  022700  177777      1$:     CMP     #-1,R0          ;IS THE RESULT -1?
4459 031762  001406                    BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 750           <====
031764  012762  000626  177776          MOV     #626,-2(R2)     ;MOVE TO MAILBOX #  *******  626  *******
031772  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
031776  000000                          HALT                    ;R0 IS NOT EQUAL TO -1
4460 032000  022701  177777      2$:     CMP     #-1,R1  ;IS THE RESULT -1?
4461 032004  001406                    BEQ     TST267
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 737           <====
032006  012762  000627  177776          MOV     #627,-2(R2)     ;MOVE TO MAILBOX #  *******  627  *******
032014  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
032020  000000                          HALT                    ;R0!1 IS NOT EQUAL TO -1
                                                                ;  OR SEQUENCE ERROR
4462
4463                                    .SBTTL ASHC SHIFTED BY 15 DM2 REG 7
4464                                            ;MODE 2 REG 7
```

```
4465                                    .SBTTL  TEST # 267 - ASHC 0 -1 SHIFTED BY 15.=77777 100000 PS=0
                                        ;*****************************************************************************
                                        ;TEST 267 - ASHC 0 -1 SHIFTED BY 15.=77777 100000 PS=0
                                        ;*****************************************************************************
                                        TST267: INC     (R2)            ;UPDATE TEST NUMBER
 032022  005212                                 CMP     #267,(R2)       ;SEQUENCE ERROR?
 032024  022712  000267                         BNE     TST270-10       ;BR TO ERROR HALT ON SEQ ERROR
 032030  001042
4466 032032  012700  000000                     MOV     #0,R0           ;LOAD R0 WITH 0
4467 032036  012701  177777                     MOV     #-1,R1  ;LOAD R0!1 WITH -1
4468 032042  000241                             CLC
4469 032044  073027  000017                     ASHC    #15.,R0         ;SHIFT R0,R0!1 BY 15.
4470 032050  013767  177776  010464             MOV     @#PS,SPSW       ;SAVE PS
4471 032056  122767  000000  010456             CMPB    #0,SPSW         ;IS THE PS 0?
4472 032064  001406                             BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 761           <====
 032066  012762  000630  177776                 MOV     #630,-2(R2)     ;MOVE TO MAILBOX #  *******  630  *******
 032074  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 032100  000000                                 HALT                    ;THE PS IS NOT EQUAL TO 0
4473 032102  022700  077777             1$:     CMP     #77777,R0       ;IS THE RESULT 77777?
4474 032106  001406                             BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 750           <====
 032110  012762  000631  177776                 MOV     #631,-2(R2)     ;MOVE TO MAILBOX #  *******  631  *******
 032116  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 032122  000000                                 HALT                    ;R0 IS NOT EQUAL TO 77777
4475 032124  022701  100000             2$:     CMP     #100000,R1      ;IS THE RESULT 100000?
4476 032130  001406                             BEQ     TST270
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 737           <====
 032132  012762  000632  177776                 MOV     #632,-2(R2)     ;MOVE TO MAILBOX #  *******  632  *******
 032140  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 032144  000000                                 HALT                    ;R0!1 IS NOT EQUAL TO 100000
                                                                        ;  OR SEQUENCE ERROR
4477
4478                                    .SBTTL ASHC SHIFTED BY 16. DM2 REG 7
4479                                            ;MODE 2 REG 7
```

```
4480                                    .SBTTL  TEST # 270 - ASHC 0 52525 SHIFTED BY 16.=52525 0 PS=0
                                        ;*****************************************************************************
                                        ;TEST 270 - ASHC 0 52525 SHIFTED BY 16.=52525 0 PS=0
                                        ;*****************************************************************************
                                        TST270: INC     (R2)            ;UPDATE TEST NUMBER
     032146  005212                            CMP     #270,(R2)       ;SEQUENCE ERROR?
     032150  022712  000270                     BNE     TST271-10       ;BR TO ERROR HALT ON SEQ ERROR
     032154  001042
4481 032156  012700  000000                     MOV     #0,R0           ;LOAD R0 WITH 0
4482 032162  012701  052525                     MOV     #52525,R1       ;LOAD R0!1 WITH 52525
4483 032166  000241                             CLC
4484 032170  073027  000020                     ASHC    #16.,R0         ;SHIFT R0,R0!1 BY 16.
4485 032174  013767  177776  010340             MOV     @#PS,SPSW       ;SAVE PS
4486 032202  122767  000000  010332             CMPB    #0,SPSW         ;IS THE PS 0?
4487 032210  001406                             BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 761           <====
     032212  012762  000633  177776             MOV     #633,-2(R2)     ;MOVE TO MAILBOX #  *******  633  *******
     032220  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     032224  000000                             HALT                    ;THE PS IS NOT EQUAL TO 0
4488 032226  022700  052525             1$:     CMP     #52525,R0       ;IS THE RESULT 52525?
4489 032232  001406                             BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 750           <====
     032234  012762  000634  177776             MOV     #634,-2(R2)     ;MOVE TO MAILBOX #  *******  634  *******
     032242  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     032246  000000                             HALT                    ;R0 IS NOT EQUAL TO 52525
4490 032250  022701  000000             2$:     CMP     #0,R1           ;IS THE RESULT 0?
4491 032254  001406                             BEQ     TST271
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 737           <====
     032256  012762  000635  177776             MOV     #635,-2(R2)     ;MOVE TO MAILBOX #  *******  635  *******
     032264  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     032270  000000                             HALT                    ;R0!1 IS NOT EQUAL TO 0
                                                                        ;  OR SEQUENCE ERROR
4492
4493                                                    ;MODE 2 REG 7
```

```
4494                                    .SBTTL  TEST # 271 - ASHC -1 0 SHIFTED BY 16. =0 0 PS=7
                                        ;*****************************************************************************
                                        ;TEST 271 - ASHC -1 0 SHIFTED BY 16. =0 0 PS=7
                                        ;*****************************************************************************
                                        TST271: INC     (R2)            ;UPDATE TEST NUMBER
 032272  005212                                 CMP     #271,(R2)       ;SEQUENCE ERROR?
 032274  022712  000271                         BNE     TST272-10       ;BR TO ERROR HALT ON SEQ ERROR
 032300  001042                         4495 032302  012700  177777     MOV     #-1,R0          ;LOAD R0 WITH -1
                                      4496 032306  012701  000000     MOV     #0,R1           ;LOAD R0!1 WITH 0
                                      4497 032312  000241             CLC
                                      4498 032314  073027  000020     ASHC    #16.,R0         ;SHIFT R0,R0!1 BY 16.
                                      4499 032320  013767  177776  010214 MOV     @#PS,SPSW       ;SAVE PS
                                      4500 032326  122767  000007  010206 CMPB    #7,SPSW         ;IS THE PS 7?
                                      4501 032334  001406             BEQ     1$
                                                                              ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                              ;           CONDITIONAL BRANCH INST. AND   <====
                                                                              ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                              ;           WHICH FOLLOWS W/ 761           <====
 032336  012762  000636  177776             MOV     #636,-2(R2)     ;MOVE TO MAILBOX #  *******  636  *******
 032344  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 032350  000000                             HALT                    ;THE PS IS NOT EQUAL TO 7
                                      4502 032352  022700  000000 1$:    CMP     #0,R0           ;IS THE RESULT 0?
                                      4503 032356  001406             BEQ     2$
                                                                              ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                              ;           CONDITIONAL BRANCH INST. AND   <====
                                                                              ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                              ;           WHICH FOLLOWS W/ 750           <====
 032360  012762  000637  177776             MOV     #637,-2(R2)     ;MOVE TO MAILBOX #  *******  637  *******
 032366  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 032372  000000                             HALT                    ;R0 IS NOT EQUAL TO 0
                                      4504 032374  022701  000000 2$:    CMP     #0,R1           ;IS THE RESULT 0?
                                      4505 032400  001406             BEQ     TST272
                                                                              ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                              ;           CONDITIONAL BRANCH INST. AND   <====
                                                                              ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                              ;           WHICH FOLLOWS W/ 737           <====
 032402  012762  000640  177776             MOV     #640,-2(R2)     ;MOVE TO MAILBOX #  *******  640  *******
 032410  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 032414  000000                             HALT                    ;R0!1 IS NOT EQUAL TO 0
                                                                      ;  OR SEQUENCE ERROR
4506
4507                                    .SBTTL ASHC SHIFTED BY @(4) DM7 REG 4
4508                                            ;MODE 7 REG 4
```

```
4509                                    .SBTTL  TEST # 272 - ASHC 125252,125252,SHIF,@(4)=177525,52525 PS=10
                                        ;*****************************************************************************
                                        ;TEST 272 - ASHC 125252,125252,SHIF,@(4)=177525,52525 PS=10
                                        ;*****************************************************************************
 032416  005212                        TST272: INC     (R2)            ;UPDATE TEST NUMBER
 032420  022712  000272                        CMP     #272,(R2)       ;SEQUENCE ERROR?
 032424  001044                                BNE     TST273-10       ;BR TO ERROR HALT ON SEQ ERROR
4510 032426  012701  125252                    MOV     #125252,R1      ;LOAD R0!1 WITH 125252
4511 032432  012700  125252                    MOV     #125252,R0      ;LOAD R0 WITH 125252
4512 032436  000241                            CLC
4513 032440  012704  042556                    MOV     #S4,R4          ;SET UP R4
4514 032444  073074  000000                    ASHC    @(R4),R0                ;SHIFT R0,R0!1 BY @(4)
4515 032450  013767  177776  010064            MOV     @#PS,SPSW       ;SAVE PS
4516 032456  122767  000010  010056            CMPB    #10,SPSW                ;IS THE PS 10?
4517 032464  001406                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 757           <====
 032466  012762  000641  177776                MOV     #641,-2(R2)     ;MOVE TO MAILBOX #  *******  641  *******
 032474  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 032500  000000                                HALT                    ;THE PS IS NOT EQUAL TO 10
4518 032502  022701  052525            1$:     CMP     #52525,R1       ;IS THE RESULT 52525?
4519 032506  001406                            BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 746           <====
 032510  012762  000642  177776                MOV     #642,-2(R2)     ;MOVE TO MAILBOX #  *******  642  *******
 032516  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 032522  000000                                HALT                    ;R0!1 IS NOT EQUAL TO 52525
4520 032524  022700  177525            2$:     CMP     #177525,R0      ;IS THE RESULT 177525?
4521 032530  001406                            BEQ     TST273
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 735           <====
 032532  012762  000643  177776                MOV     #643,-2(R2)     ;MOVE TO MAILBOX #  *******  643  *******
 032540  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 032544  000000                                HALT                    ;R0 IS NOT EQUAL TO 177525
                                                                        ;  OR SEQUENCE ERROR
4522
4523
```

```
4524                                    .SBTTL  TEST # 273 -  MUL  100000 * #100000 = 40000 0  PS=1
                                        ;*****************************************************************************
                                        ;TEST 273 -  MUL  100000 * #100000 = 40000 0  PS=1
                                        ;*****************************************************************************
 032546  005212                        TST273: INC     (R2)            ;UPDATE TEST NUMBER
 032550  022712  000273                        CMP     #273,(R2)       ;SEQUENCE ERROR?
 032554  001043                                BNE     TST274-10       ;BR TO ERROR HALT ON SEQ ERROR
4525 032556  012706  001000                    MOV     #STBOT,R6
4526 032562  005037  177776                    CLR     @#PS
4527 032566  012700  100000                    MOV     #100000,R0      ;LOAD MULTIPLICAN WITH 100000
4528 032572  070027  100000                    MUL     #100000,R0      ;MULTIPLY 100000 BY #100000
4529 032576  013767  177776  007736            MOV     @#PS,SPSW       ;SAVE PS
4530 032604  122767  000001  007730            CMPB    #1,SPSW         ;IS PS = 1
4531 032612  001406                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 760           <====
 032614  012762  000644  177776                MOV     #644,-2(R2)     ;MOVE TO MAILBOX #  *******  644  *******
 032622  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 032626  000000                                HALT                    ;PS IS WRONG
4532 032630  022700  040000            1$:     CMP     #40000,R0       ;IS HIGH ORDER = 40000
4533 032634  001406                            BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 747           <====
 032636  012762  000645  177776                MOV     #645,-2(R2)     ;MOVE TO MAILBOX #  *******  645  *******
 032644  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 032650  000000                                HALT                    ;HIGH ORDER IS WRONG
4534 032652  022701  000000            2$:     CMP     #0,R1           ;IS LOWER = 0
4535 032656  001406                            BEQ     TST274
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 736           <====
 032660  012762  000646  177776                MOV     #646,-2(R2)     ;MOVE TO MAILBOX #  *******  646  *******
 032666  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 032672  000000                                HALT                    ;LOW ORDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
4536
4537                                            ;TEST MSB OF LOWER PRODUCT CLEAR C-BIT
4538                                            ;MODE 2 /REG7
```

```
4539                                    .SBTTL  TEST # 274 -  MUL  70707 * #70707 = 31221 44261  PS=1
                                        ;*****************************************************************************
                                        ;TEST 274 -  MUL  70707 * #70707 = 31221 44261  PS=1
                                        ;*****************************************************************************
                                        TST274: INC     (R2)            ;UPDATE TEST NUMBER
     032674  005212                             CMP     #274,(R2)       ;SEQUENCE ERROR?
     032676  022712  000274                     BNE     TST275-10       ;BR TO ERROR HALT ON SEQ ERROR
     032702  001037
4540 032704  012700  070707                     MOV     #70707,R0       ;LOAD MULTIPLICAN WITH 70707
4541 032710  070027  070707                     MUL     #70707,R0       ;MULTIPLY 70707 BY #70707
4542 032714  013767  177776  007620             MOV     @#PS,SPSW       ;SAVE PS = 1
4543 032722  122767  000001  007612             CMPB    #1,SPSW         ;IS PS = 1
4544 032730  001406                             BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
     032732  012762  000647  177776             MOV     #647,-2(R2)     ;MOVE TO MAILBOX #  *******  647  *******
     032740  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     032744  000000                             HALT                    ;PS IS WRONG
4545 032746  022700  031221             1$:     CMP     #31221,R0       ;IS HIGH ORDER =31221
4546 032752  001406                             BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 753           <====
     032754  012762  000650  177776             MOV     #650,-2(R2)     ;MOVE TO MAILBOX #  *******  650  *******
     032762  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     032766  000000                             HALT                    ;HIGH ORDER IS WRONG
4547 032770  022701  044261             2$:     CMP     #44261,R1       ;IS LOWER ORDER =44261
4548 032774  001406                             BEQ     TST275
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 742           <====
     032776  012762  000651  177776             MOV     #651,-2(R2)     ;MOVE TO MAILBOX #  *******  651  *******
     033004  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     033010  000000                             HALT                    ;LOW ORDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
4549
4550                                    ;STORE UPPER PRODUCT AND SET C-BIT NEG #
4551                                    ;MODE 2 /REG 7
```

```
4552                                    .SBTTL  TEST # 275 -  MUL  107070 * #107070 = 31222 26100 PS=1
                                        ;*****************************************************************************
                                        ;TEST 275 -  MUL  107070 * #107070 = 31222 26100 PS=1
                                        ;*****************************************************************************
033012  005212                          TST275: INC     (R2)            ;UPDATE TEST NUMBER
033014  022712  000275                          CMP     #275,(R2)       ;SEQUENCE ERROR?
033020  001037                                 BNE     TST276-10       ;BR TO ERROR HALT ON SEQ ERROR
4553 033022  012700  107070                    MOV     #107070,R0      ;LOAD MULTIPLICAN WITH 107070
4554 033026  070027  107070                    MUL     #107070,R0      ;MULTIPLY 107070 BY #107070
4555 033032  013767  177776  007502           MOV     @#PS,SPSW       ;SAVE PS
4556 033040  122767  000001  007474           CMPB    #1,SPSW         ;IS PS = 1
4557 033046  001406                           BEQ     1$
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 764           <====
033050  012762  000652  177776                 MOV     #652,-2(R2)     ;MOVE TO MAILBOX #  *******  652  *******
033056  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033062  000000                                 HALT                    ;PS IS WRONG
4558 033064  022700  031222           1$:     CMP     #31222,R0       ;IS HIGH ORDER = 31222
4559 033070  001406                           BEQ     2$
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 753           <====
033072  012762  000653  177776                 MOV     #653,-2(R2)     ;MOVE TO MAILBOX #  *******  653  *******
033100  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033104  000000                                 HALT                    ;
4560 033106  022701  026100           2$:     CMP     #26100,R1       ;IS LOW ORDER = 26100
4561 033112  001406                           BEQ     TST276
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 742           <====
033114  012762  000654  177776                 MOV     #654,-2(R2)     ;MOVE TO MAILBOX #  *******  654  *******
033122  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033126  000000                                 HALT                    ;LOW ORDER IS WRONG
                                                                       ;  OR SEQUENCE ERROR
4562                                                   ;PUT MULTIPLER IN R12 AND TEST SIGN FOR ZERO
4563                                                   ;MODE 2 /REG 7
```

```
4564                                    .SBTTL  TEST # 276 -  MUL  77777 * #100000 = 140000 100000 PS=11
                                        ;*****************************************************************************
                                        ;TEST 276 -  MUL  77777 * #100000 = 140000 100000 PS=11
                                        ;*****************************************************************************
 033130  005212                         TST276: INC     (R2)            ;UPDATE TEST NUMBER
 033132  022712  000276                         CMP     #276,(R2)       ;SEQUENCE ERROR?
 033136  001037                                 BNE     TST277-10       ;BR TO ERROR HALT ON SEQ ERROR
4565 033140  012700  077777                     MOV     #77777,R0       ;LOAD MULTIPLICAN WITH 77777
4566 033144  070027  100000                     MUL     #100000,R0      ;MULTIPLY 77777 BY #100000
4567 033150  013767  177776  007364             MOV     @#PS,SPSW       ;SAVE PS
4568 033156  122767  000011  007356             CMPB    #11,SPSW                ;IS PS = 11
4569 033164  001406                             BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
 033166  012762  000655  177776                 MOV     #655,-2(R2)     ;MOVE TO MAILBOX #  *******  655  *******
 033174  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 033200  000000                                 HALT                    ;PS IS WRONG
4570 033202  022700  140000             1$:     CMP     #140000,R0      ;IS HIGH ORDER = 140000
4571 033206  001406                             BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 753           <====
 033210  012762  000656  177776                 MOV     #656,-2(R2)     ;MOVE TO MAILBOX #  *******  656  *******
 033216  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 033222  000000                                 HALT                    ;HIGH ORDER IS WRONG
4572 033224  022701  100000             2$:     CMP     #100000,R1      ;IS LOW ORDER = 100000
4573 033230  001406                             BEQ     TST277
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 742           <====
 033232  012762  000657  177776                 MOV     #657,-2(R2)     ;MOVE TO MAILBOX #  *******  657  *******
 033240  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 033244  000000                                 HALT                    ;LOW ORDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
4574
4575                                                    ;SET Z-BIT R17 = 0
4576                                                    ;MODE 2 /REG 7
```

```
4577                                    .SBTTL  TEST # 277 -  MUL  -1 * #0 = 0 0  PS=4
                                        ;*****************************************************************************
                                        ;TEST 277 -  MUL  -1 * #0 = 0 0  PS=4
                                        ;*****************************************************************************
033246  005212                          TST277: INC     (R2)            ;UPDATE TEST NUMBER
033250  022712  000277                          CMP     #277,(R2)       ;SEQUENCE ERROR?
033254  001037                                  BNE     TST300-10       ;BR TO ERROR HALT ON SEQ ERROR
4578 033256  012700  177777                    MOV     #-1,R0          ;LOAD MULTIPLICAN WITH -1
4579 033262  070027  000000                    MUL     #0,R0           ;MULTIPLY -1 BY #0
4580 033266  013767  177776  007246           MOV     @#PS,SPSW       ;SAVE PS
4581 033274  122767  000004  007240           CMPB    #4,SPSW         ;IS PS = 4
4582 033302  001406                           BEQ     1$
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 764           <====
033304  012762  000660  177776                    MOV     #660,-2(R2)     ;MOVE TO MAILBOX #  *******  660  *******
033312  005262  177774                           INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033316  000000                                   HALT                    ;PS IS WRONG
4583 033320  022700  000000           1$:       CMP     #0,R0           ;IS HIGH ORDER = 0
4584 033324  001406                           BEQ     2$
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 753           <====
033326  012762  000661  177776                    MOV     #661,-2(R2)     ;MOVE TO MAILBOX #  *******  661  *******
033334  005262  177774                           INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033340  000000                                   HALT                    ;HIGH ORDER IS WRONG
4585 033342  022701  000000           2$:       CMP     #0,R1           ;IS LOW ORDER = 0
4586 033346  001406                           BEQ     TST300
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 742           <====
033350  012762  000662  177776                    MOV     #662,-2(R2)     ;MOVE TO MAILBOX #  *******  662  *******
033356  005262  177774                           INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033362  000000                                   HALT                    ;LOW ORDER IS WRONG
                                                                       ;  OR SEQUENCE ERROR
4587
4588                                            ;TEST UPPER PRODUCT FOR ALL ONES,CLEAR C-BIT
4589                                            ;MODE 2 /REG 7
```

```
4590                                    .SBTTL  TEST # 300 -  MUL  -1 * #77777 = 100001 100001  PS=10
                                        ;*****************************************************************************
                                        ;TEST 300 -  MUL  -1 * #77777 = 100001 100001  PS=10
                                        ;*****************************************************************************
033364  005212                        TST300: INC     (R2)            ;UPDATE TEST NUMBER
033366  022712  000300                        CMP     #300,(R2)       ;SEQUENCE ERROR?
033372  001037                                BNE     TST301-10       ;BR TO ERROR HALT ON SEQ ERROR
4591 033374  012701  177777                   MOV     #-1,R1          ;LOAD MULTIPLICAN WITH -1
4592 033400  070127  077777                   MUL     #77777,R1       ;MULTIPLY -1 BY #77777
4593 033404  013767  177776  007130           MOV     @#PS,SPSW       ;SAVE PS
4594 033412  122767  000010  007122           CMPB    #10,SPSW                ;IS PS = 10
4595 033420  001406                           BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
033422  012762  000663  177776                MOV     #663,-2(R2)     ;MOVE TO MAILBOX #  *******  663  *******
033430  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033434  000000                                HALT                    ;PS IS WRONG
4596 033436  022701  100001           1$:     CMP     #100001,R1      ;IS HIGH ORDER = 100001
4597 033442  001406                           BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 753           <====
033444  012762  000664  177776                MOV     #664,-2(R2)     ;MOVE TO MAILBOX #  *******  664  *******
033452  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033456  000000                                HALT                    ;HIGHT ORDER IS WRONG
4598 033460  022701  100001           2$:     CMP     #100001,R1      ;IS LOW ORDER = 100001
4599 033464  001406                           BEQ     TST301
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 742           <====
033466  012762  000665  177776                MOV     #665,-2(R2)     ;MOVE TO MAILBOX #  *******  665  *******
033474  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033500  000000                                HALT                    ;LOW ORDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
4600                                                    ;MODE 2 /REG 7
```

```
4601                                    .SBTTL  TEST # 301 -  MUL 2 * #2 = 0 4 PS=0
                                        ;*****************************************************************************
                                        ;TEST 301 -  MUL 2 * #2 = 0 4 PS=0
                                        ;*****************************************************************************
033502  005212                  TST301: INC     (R2)            ;UPDATE TEST NUMBER
033504  022712  000301                  CMP     #301,(R2)       ;SEQUENCE ERROR?
033510  001037                          BNE     TST302-10       ;BR TO ERROR HALT ON SEQ ERROR
4602 033512  012700  000002            MOV     #2,R0           ;LOAD MULTIPLICAN WITH 2
4603 033516  070027  000002            MUL     #2,R0           ;MULTIPLY 2 BY #2
4604 033522  013767  177776  007012    MOV     @#PS,SPSW       ;SAVE PS
4605 033530  122767  000000  007004    CMPB    #0,SPSW         ;IS PS=0
4606 033536  001406                    BEQ     1$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 764           <====
033540  012762  000666  177776          MOV     #666,-2(R2)     ;MOVE TO MAILBOX #  *******  666  *******
033546  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033552  000000                          HALT                    ;PS IS WRONG
4607 033554  022700  000000      1$:    CMP     #0,R0           ;IS HIGH ORDER =0
4608 033560  001406                    BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 753           <====
033562  012762  000667  177776          MOV     #667,-2(R2)     ;MOVE TO MAILBOX #  *******  667  *******
033570  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033574  000000                          HALT                    ;HIGH ORDER IS WRONG
4609 033576  022701  000004      2$:    CMP     #4,R1           ;IS LOW ORDER =4
4610 033602  001406                    BEQ     TST302
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 742           <====
033604  012762  000670  177776          MOV     #670,-2(R2)     ;MOVE TO MAILBOX #  *******  670  *******
033612  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033616  000000                          HALT                    ;LOW ORDER IS WRONG
                                                                ;  OR SEQUENCE ERROR
4611
4612                                                    ;MODE 2 /REG 7
```

```
4613                                    .SBTTL  TEST # 302 - MUL 1 * #-1 = -1 -1 PS=10
                                        ;*****************************************************************************
                                        ;TEST 302 - MUL 1 * #-1 = -1 -1 PS=10
                                        ;*****************************************************************************
033620  005212                        TST302: INC     (R2)            ;UPDATE TEST NUMBER
033622  022712  000302                        CMP     #302,(R2)       ;SEQUENCE ERROR?
033626  001037                                BNE     TST303-10       ;BR TO ERROR HALT ON SEQ ERROR
4614 033630  012700  000001                    MOV     #1,R0           ;LOAD MULTIPLICAN WITH 1
4615 033634  070027  177777                    MUL     #-1,R0  ;MULTIPLY 1 BY #-1
4616 033640  013767  177776  006674            MOV     @#PS,SPSW       ;SAVE PS
4617 033646  122767  000010  006666            CMPB    #10,SPSW                ;IS PS =10
4618 033654  001406                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
033656  012762  000671  177776                MOV     #671,-2(R2)     ;MOVE TO MAILBOX #  *******  671  *******
033664  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033670  000000                                HALT                    ;PS IS WRONG
4619 033672  022700  177777            1$:     CMP     #-1,R0          ;IS HIGH ORDER =-1
4620 033676  001406                            BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 753           <====
033700  012762  000672  177776                MOV     #672,-2(R2)     ;MOVE TO MAILBOX #  *******  672  *******
033706  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033712  000000                                HALT                    ;HIGH ORDER IS WRONG
4621 033714  022701  177777            2$:     CMP     #-1,R1  ;IS LOW ORDER =-1
4622 033720  001406                            BEQ     TST303
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 742           <====
033722  012762  000673  177776                MOV     #673,-2(R2)     ;MOVE TO MAILBOX #  *******  673  *******
033730  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
033734  000000                                HALT                    ;LOW ORDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
4623                                                    ;MODE 2 /REG 7
```

```
4624                                    .SBTTL  TEST # 303 - MUL -1 * #100000 = 0 100000 PS=1
                                        ;*****************************************************************************
                                        ;TEST 303 - MUL -1 * #100000 = 0 100000 PS=1
                                        ;*****************************************************************************
033736  005212                  TST303: INC     (R2)            ;UPDATE TEST NUMBER
033740  022712  000303                  CMP     #303,(R2)       ;SEQUENCE ERROR?
033744  001037                          BNE     TST304-10       ;BR TO ERROR HALT ON SEQ ERROR
4625 033746  012700  177777            MOV     #-1,R0          ;LOAD MULTIPLICAN WITH -1
4626 033752  070027  100000            MUL     #100000,R0      ;MULTIPLY -1 BY 100000
4627 033756  013767  177776  006556    MOV     @#PS,SPSW       ;SAVE PS
4628 033764  122767  000001  006550    CMPB    #1,SPSW         ;IS PS =1
4629 033772  001406                    BEQ     1$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 764           <====
033774  012762  000674  177776            MOV     #674,-2(R2)     ;MOVE TO MAILBOX #  *******  674  *******
034002  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
034006  000000                          HALT                    ;PS IS WRONG
4630 034010  022700  000000      1$:    CMP     #0,R0           ;IS HIGH ORDER = 0
4631 034014  001406                    BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 753           <====
034016  012762  000675  177776            MOV     #675,-2(R2)     ;MOVE TO MAILBOX #  *******  675  *******
034024  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
034030  000000                          HALT                    ;HIGH ORDER IS WRONG
4632 034032  022701  100000      2$:    CMP     #100000,R1      ;IS LOW ORDER =100000
4633 034036  001406                    BEQ     TST304
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 742           <====
034040  012762  000676  177776            MOV     #676,-2(R2)     ;MOVE TO MAILBOX #  *******  676  *******
034046  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
034052  000000                          HALT                    ;LOW ORDER IS WRONG
                                                                ;  OR SEQUENCE ERROR
4634
4635
4636
4637                                    .SBTTL DIV USING DM6 REG 7
```

```
4638                                    .SBTTL  TEST # 304 -  DIV 0 52525/S1=25252 REM=1 PS=0
                                        ;*****************************************************************************
                                        ;TEST 304 -  DIV 0 52525/S1=25252 REM=1 PS=0
                                        ;*****************************************************************************
     034054  005212                     TST304: INC     (R2)            ;UPDATE TEST NUMBER
     034056  022712  000304                     CMP     #304,(R2)       ;SEQUENCE ERROR?
     034062  001043                             BNE     TST305-10       ;BR TO ERROR HALT ON SEQ ERROR
4639 034064  012700  000000                     MOV     #0,R0           ;LOAD HIGH ORDER WITH R0
4640 034070  012701  052525                     MOV     #52525,R1       ;LOAD LOW ORDER WITH 52525
4641 034074  012703  042550                     MOV     #S1,R3          ; SET UP R3
4642 034100  071067  006444                     DIV     S1,R0           ;DIVIDE BY S1
4643 034104  013767  177776  006430             MOV     @#PS,SPSW       ;SAVE PS
4644 034112  122767  000000  006422             CMPB    #0,SPSW         ;IS PS=0
4645 034120  001406                             BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 760           <====
     034122  012762  000677  177776             MOV     #677,-2(R2)     ;MOVE TO MAILBOX #  *******  677  *******
     034130  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     034134  000000                             HALT                    ;PS IS WRONG
4646 034136  022700  025252             1$:     CMP     #25252,R0       ;IS QUOTIENT =25252
4647 034142  001406                             BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 747           <====
     034144  012762  000700  177776             MOV     #700,-2(R2)     ;MOVE TO MAILBOX #  *******  700  *******
     034152  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     034156  000000                             HALT                    ;QUOTIENT IS WRONG
4648 034160  022701  000001             2$:     CMP     #1,R1           ;IS REMAINDER =1
4649 034164  001406                             BEQ     TST305
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 736           <====
     034166  012762  000701  177776             MOV     #701,-2(R2)     ;MOVE TO MAILBOX #  *******  701  *******
     034174  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     034200  000000                             HALT                    ;REMAINDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
4650
4651                                    .SBTTL DIV USING DM7 REG 7
```

```
4652                                    .SBTTL  TEST # 305 - DUV 0 52525/@S2 =25252 REM=1 PS=0
                                        ;*****************************************************************************
                                        ;TEST 305 - DUV 0 52525/@S2 =25252 REM=1 PS=0
                                        ;*****************************************************************************
     034202  005212                     TST305: INC     (R2)            ;UPDATE TEST NUMBER
     034204  022712  000305                     CMP     #305,(R2)       ;SEQUENCE ERROR?
     034210  001043                             BNE     TST306-10       ;BR TO ERROR HALT ON SEQ ERROR
4653 034212  012700  000000                     MOV     #0,R0           ;LOAD HIGH ORDER WITH R0
4654 034216  012701  052525                     MOV     #52525,R1       ;LOAD LOW ORDER WITH 52525
4655 034222  012704  042552                     MOV     #S2,R4          ; SET UP R4
4656 034226  071077  006320                     DIV     @S2,R0          ;DIVIDE BY @S2
4657 034232  013767  177776  006302             MOV     @#PS,SPSW       ;SAVE PS
4658 034240  122767  000000  006274             CMPB    #0,SPSW         ;IS PS=0
4659 034246  001406                             BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 760           <====
     034250  012762  000702  177776             MOV     #702,-2(R2)     ;MOVE TO MAILBOX #  *******  702  *******
     034256  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     034262  000000                             HALT                    ;PS IS WRONG
4660 034264  022700  025252             1$:     CMP     #25252,R0       ;IS QUOTIENT =25252
4661 034270  001406                             BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 747           <====
     034272  012762  000703  177776             MOV     #703,-2(R2)     ;MOVE TO MAILBOX #  *******  703  *******
     034300  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     034304  000000                             HALT                    ;QUOTIENT IS WRONG
4662 034306  022701  000001             2$:     CMP     #1,R1           ;IS REMINDER =1
4663 034312  001406                             BEQ     TST306
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 736           <====
     034314  012762  000704  177776             MOV     #704,-2(R2)     ;MOVE TO MAILBOX #  *******  704  *******
     034322  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     034326  000000                             HALT                    ;REMINDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
4664
4665
4666                                    .SBTTL DIV USING DM3 REG 7
4667                                            ;CLEAR V-BIT MODE 3 REG 7
```

```
4668                                    .SBTTL  TEST # 306 - DIV 0 52525/@#S1 =25252 REM=1 PS=0
                                        ;*****************************************************************************
                                        ;TEST 306 - DIV 0 52525/@#S1 =25252 REM=1 PS=0
                                        ;*****************************************************************************
      034330  005212                  TST306: INC     (R2)            ;UPDATE TEST NUMBER
      034332  022712  000306                  CMP     #306,(R2)       ;SEQUENCE ERROR?
      034336  001043                          BNE     TST307-10       ;BR TO ERROR HALT ON SEQ ERROR
4669  034340  012700  000000                  MOV     #0,R0           ;LOAD HIGH ORDER WITH R0
4670  034344  012701  052525                  MOV     #52525,R1       ;LOAD LOW ORDER WITH 52525
4671  034350  012703  042550                  MOV     #S1,R3          ; SET UP R3
4672  034354  071037  042550                  DIV     @#S1,R0         ;DIVIDE BY @#S1
4673  034360  013767  177776  006154          MOV     @#PS,SPSW       ;SAVE PS
4674  034366  122767  000000  006146          CMPB    #0,SPSW         ;IS PS=0
4675  034374  001406                          BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 760           <====
      034376  012762  000705  177776          MOV     #705,-2(R2)     ;MOVE TO MAILBOX #  *******  705  *******
      034404  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      034410  000000                          HALT                    ;PS IS WRONG
4676  034412  022700  025252          1$:     CMP     #25252,R0       ;IS QUOTIENT =25252
4677  034416  001406                          BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 747           <====
      034420  012762  000706  177776          MOV     #706,-2(R2)     ;MOVE TO MAILBOX #  *******  706  *******
      034426  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      034432  000000                          HALT                    ;QUOTIENT IS WRONG
4678  034434  022701  000001          2$:     CMP     #1,R1           ;IS REMAINDER =1
4679  034440  001406                          BEQ     TST307
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 736           <====
      034442  012762  000707  177776          MOV     #707,-2(R2)     ;MOVE TO MAILBOX #  *******  707  *******
      034450  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      034454  000000                          HALT                    ;REMAINDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
4680
4681                                    .SBTTL DIV USING DMO REG 4
4682                                            ;MODE 0 REG 2
```

```
4683                                    .SBTTL  TEST # 307 - DIV 0 52525 /R4=25252 REM=1 PS=0
                                        ;*****************************************************************************
                                        ;TEST 307 - DIV 0 52525 /R4=25252 REM=1 PS=0
                                        ;*****************************************************************************
                                        ;
                                        TST307: INC     (R2)            ;UPDATE TEST NUMBER
     034456  005212                             CMP     #307,(R2)       ;SEQUENCE ERROR?
     034460  022712  000307                     BNE     TST310-10       ;BR TO ERROR HALT ON SEQ ERROR
     034464  001042
4684 034466  012700  000000                     MOV     #0,R0           ;LOAD HIGH ORDER WITH 0
4685 034472  012701  052525                     MOV     #52525,R1       ;LOAD LOW ORDER WITH 52525
4686 034476  012704  000002                     MOV     #2,R4           ; SET UP R4
4687 034502  071004                             DIV     R4,R0           ;DIVIDE BY R4
4688 034504  013767  177776  006030             MOV     @#PS,SPSW       ;SAVE PS
4689 034512  122767  000000  006022             CMPB    #0,SPSW         ;IS PS=0
4690 034520  001406                             BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 761           <====
     034522  012762  000710  177776             MOV     #710,-2(R2)     ;MOVE TO MAILBOX #  *******  710  *******
     034530  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     034534  000000                             HALT                    ;PS IS WRONG
4691 034536  022700  025252             1$:     CMP     #25252,R0       ;IS QUOTIENT=25252
4692 034542  001406                             BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 750           <====
     034544  012762  000711  177776             MOV     #711,-2(R2)     ;MOVE TO MAILBOX #  *******  711  *******
     034552  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     034556  000000                             HALT                    ;QUOTIENT IS WRONG
4693 034560  022701  000001             2$:     CMP     #1,R1           ;IS REMAINDER =1
4694 034564  001406                             BEQ     TST310
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 737           <====
     034566  012762  000712  177776             MOV     #712,-2(R2)     ;MOVE TO MAILBOX #  *******  712  *******
     034574  005262  177774                     INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     034600  000000                             HALT                    ;REMAINDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
4695
4696
4697                                    ;=============================================================================
4698                                    ;
4699                                    ;                       WARNING!
4700                                    ;
4701                                    ;       THE FOLLOWING CIS ABORT TEST MUST BE LOCATED BELOW
4702                                    ;       MEMORY LOCATION 40000 DUE TO THE MEMORY MANAGEMENT
4703                                    ;       SETUP REQUIRED IN THE TEST.
4704                                    ;
4705                                    ;       ALSO THE TEST DESTROYS THE CONTENTS OF MEMORY IN THE
4706                                    ;       FOLLOWING RANGES:
4707                                    ;
4708                                    ;               57670-60070
4709                                    ;               76000-76001
4710                                    ;
4711                                    ;       THIS WARNING IS PRIMARILY AIMED AT FUTURE MODIFIERS OF THIS CPU DIAGNOSTIC.
```

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4712                            ;
4713                            ;===============================================================================
4714
4715
4716
4717
4718                            ;*******************************************************************************
4719                            ;
4720                            ;CIS STACK 'PROBE AHEAD'' MEMORY MANAGEMENT ABORT TESTS
4721                            ;
4722                            ;       THE NEXT THREE SUBTESTS ARE AIMED AT TESTING THE KT
4723                            ;       PAGE FAULT ROM (SCHEMATIC PAGE K1-8) AND ASSOCIATED LOGIC.
4724                            ;       NOTE: THESE 3 SUBTESTS ARE OPTIONAL AND ARE SELECTED BY SETTING MFM
4725                            ;       HARDWARE SWITCH REGISTER BIT 08 TO A 1 IN THE CASE OF
4726                            ;       STANDALONE OPERATION OF THE DIAGNOSTIC.  IN THE CASE OF
4727                            ;       MANUFACTURING APT RUNTIME MODE THEN BIT 08 OF $SWREG IS SET TO 1
4728                            ;       THRU APT SCRIPTING.
4729                            ;
4730                            ;       EACH OF THESE 3 SUBTESTS SETUP THE STACK POINTER SUCH THAT
4731                            ;       WHEN THE CIS PROCESSOR CHECKS TO SEE IF THERE IS ENOUGH
4732                            ;       SPACE ON THE STACK (200 BYTES) THE ANSWER FOUND SHOULD BE
4733                            ;       NO BECAUSE A PORTION OF THE STACK IS IN PROTECTED MEMORY.
4734                            ;
4735                            ;       EACH OF THESE 3 SUBTESTS VERIFY THAT THE CIS INSTRUCTION ABORTS
4736                            ;       UNDER SEVERAL CONDITIONS OF MEMORY MANAGEMENT PAGE PROTECTION.
4737                            ;       ALL OF THE PAGE PROTECTION DATA IS LISTED IN TABLE 'PDRTAB'.
4738
4739                            ;       THIS  TEST ALLOWS MFG. TO  ELIMINATE
4740                            ;       HAVING TO RUN THE CIS DIAGNOSTIC DURING QUICK
4741                            ;       VERIFY TESTING OF THE CPU MODULE.
4742                            ;
4743
4744            000377          FILL=377
4745            076130          MOVCI=76130
```

```
 4746                                   .SBTTL  TEST # 310 - CIS STACK PROBE AHEAD MEM MGMT ABORT TEST
                                        ;*****************************************************************************
                                        ;TEST 310 - CIS STACK PROBE AHEAD MEM MGMT ABORT TEST
                                        ;*****************************************************************************
                                        ;
      034602  005212                   TST310: INC     (R2)            ;UPDATE TEST NUMBER
      034604  022712  000310                   CMP     #310,(R2)       ;SEQUENCE ERROR?
      034610  001020                           BNE     6$              ;BR TO ERROR HALT ON SEQ ERROR
 4747 034612  132767  000200  143501         BITB #200,$ENVM         ;IS APT SIZING?
 4748 034620  001405                         BEQ 4$                  ;NO; TRY HARDWARE SWITCH REGISTER
 4749 034622  032767  000400  143472         BIT #400,$SWREG         ;YES APT IS SIZING; DOES APT SAY TO DO THIS TEST
 4750 034630  001406                         BEQ 5$                  ;NO ; SKIP TEST
 4751 034632  000411                         BR 1$                   ;YES, DO TEST
 4752 034634  032737  000400  177570  4$:    BIT #400,@#177570       ;DOES HARDWARE SWITCH REGISTER SAY TO DO TEST?
 4753 034642  001401                         BEQ 5$                  ;NO, SKIP TEST
 4754 034644  000404                         BR 1$                   ;YES, DO TEST
 4755 034646  000167  001102          5$:    JMP TST311
 4756 034652  000167  001066          6$:    JMP TST311-10
 4757
 4758                                   ;SETUP PAR'S FOR DIRECT MAPPING
 4759                                   ;
 4760 034656  005037  172516          1$:    CLR @#MMR3              ;CLEAR OUT D-SPACE ENABLES
 4761 034662  010667  001016                 MOV SP,STK1             ;SAVE THE STACK POINTER
 4762
 4763 034666  012737  000000  172340         MOV #0,@#KIPAR0         ;SETUP KERNEL I-SPACE PAR'S
 4764 034674  012737  000200  172342         MOV #200,@#KIPAR1
 4765 034702  012737  000400  172344         MOV #400,@#KIPAR2
 4766 034710  012737  000600  172346         MOV #600,@#KIPAR3
 4767 034716  012737  001000  172350         MOV #1000,@#KIPAR4
 4768 034724  012737  001200  172352         MOV #1200,@#KIPAR5
 4769 034732  012737  001400  172354         MOV #1400,@#KIPAR6
 4770 034740  012737  177600  172356         MOV #177600,@#KIPAR7
 4771
 4772 034746  012737  000000  172240         MOV #0,@#SIPAR0         ;SETUP SUPERVISOR I-SPACE PAR'S
 4773 034754  012737  000200  172242         MOV #200,@#SIPAR1
 4774 034762  012737  000400  172244         MOV #400,@#SIPAR2
 4775 034770  012737  000600  172246         MOV #600,@#SIPAR3
 4776 034776  012737  001000  172250         MOV #1000,@#SIPAR4
 4777 035004  012737  001200  172252         MOV #1200,@#SIPAR5
 4778 035012  012737  001400  172254         MOV #1400,@#SIPAR6
 4779 035020  012737  177600  172256         MOV #177600,@#SIPAR7
 4780
 4781 035026  012737  000000  177640         MOV #0,@#UIPAR0         ;SETUP USER I-SPACE PAR'S
 4782 035034  012737  000200  177642         MOV #200,@#UIPAR1
 4783 035042  012737  000400  177644         MOV #400,@#UIPAR2
 4784 035050  012737  000600  177646         MOV #600,@#UIPAR3
 4785 035056  012737  001000  177650         MOV #1000,@#UIPAR4
 4786 035064  012737  001200  177652         MOV #1200,@#UIPAR5
 4787 035072  012737  001400  177654         MOV #1400,@#UIPAR6
 4788 035100  012737  177600  177656         MOV #177600,@#UIPAR7
 4789
 4790
 4791                                   ;SETUP PDR'S FOR R/W ACCESS
 4792                                   ;
 4793
 4794 035106                            SETPDR:
 4795 035106  012700  172300                 MOV #KIPDR0,R0
 4796 035112  012720  177406          1$:    MOV #177406,(R0)+
```

```
4797 035116  020027  172316              CMP R0,#KIPDR7
4798 035122  101773                      BLOS 1$
4799
4800 035124  012700  172200              MOV #SIPDR0,R0
4801 035130  012720  177406      2$:     MOV #177406,(R0)+
4802 035134  020027  172216              CMP R0,#SIPDR7
4803 035140  101773                      BLOS 2$
4804
4805 035142  012700  177600              MOV #UIPDR0,R0
4806 035146  012720  177406      3$:     MOV #177406,(R0)+
4807 035152  020027  177616              CMP R0,#UIPDR7
4808 035156  101773                      BLOS 3$
4809
4810                             ;KERNEL MODE CIS STACK PROBE AHEAD MEM MGMT ABORT SUBTEST
4811                             ;
4812
4813 035160                      KMTSTS:
4814 035160  012737  035564  000250      MOV #MMHDLR,@#MMVEC          ;SETUP MEM MGMT INTERRRUPT VECTOR
4815 035166  012737  000340  000252      MOV #PR7,@#MMVEC+2
4816 035174  012701  035244              MOV #1$,R1                   ;SETUP INTR RETURN ADDRESS
4817 035200  012700  035706              MOV #PDRTAB,R0
4818 035204  012706  060070              MOV #60070,SP
4819
4820 035210  011037  172304      2$:     MOV (R0),@#KIPDR2            ;PROTECT PART OF STACK
4821 035214  012737  000001  177572      MOV #1,@#MMR0                ;TURN ON MEMORY MGMT
4822
4823 035222  004767  000356              JSR PC,SAVR                  ;SAVE REGISTERS
4824
4825 035226  076130                      MOVCI                        ;EXECUTE THE CIS INSTRUCTION
4826 035230  035574                      SRC.PTR
4827 035232  035600                      DST.PTR
4828 035234  000377                      FILL
4829 035236  000240                      NOP
4830 035240  000240                      NOP
4831 035242  000000                      HALT                         ;CIS INSTRUCTION SHOULD HAVE ABORTED BUT DIDN'T
4832
4833 035244  004767  000366      1$:     JSR PC,RESR                  ;RESTORE REGISTERS
4834 035250  062700  000002              ADD #2,R0                    ;UPDATE PROTECTION SCHEME TO NEXT TABLE CASE
4835 035254  005710                      TST (R0)                     ;ANY CASES LEFT TO TRY?
4836 035256  001354                      BNE 2$                       ;BRANCH IF YES
4837
4838 035260  005037  177572              CLR @#MMR0                   ;NO - PREPARE TO EXIT TEST
4839 035264  012737  177406  172304      MOV #177406,@#KIPDR2         ;RESTORE R/W ACCESS TO STACK AREA
4840
4841
4842                             ;SUPERVISOR MODE CIS STACK PROBEAHEAD MEMORY MGMT ABORT SUBTEST
4843                             ;
4844
4845 035272  012737  035564  000250  SMTSTS: MOV #MMHDLR,@#MMVEC         ;SETUP MEM MGMT INTERRRUPT VECTOR
4846 035300  012737  040340  000252          MOV #040340,@#MMVEC+2
4847 035306  012701  035372              MOV #1$,R1                   ;SETUP INTR RETURN ADDRESS
4848 035312  012700  035706              MOV #PDRTAB,R0
4849 035316  012737  040340  177776      MOV #040340,@#PSW            ;SWITCH TO SUPERVISOR MODE
4850 035324  012706  060070              MOV #60070,SP
4851
4852 035330  011037  172204      2$:     MOV (R0),@#SIPDR2            ;PROTECT PART OF STACK
4853 035334  012737  000001  177572      MOV #1,@#MMR0                ;TURN ON MEMORY MGMT
```

```
4854
4855 035342  004767  000236                  JSR PC,SAVR                     ;SAVE REGISTERS
4856
4857 035346  076130                          MOVCI                           ;EXECUTE THE CIS INSTRUCTION
4858 035350  035574                          SRC.PTR
4859 035352  035600                          DST.PTR
4860 035354  000377                          FILL
4861
4862 035356  000240                          NOP
4863 035360  000240                          NOP
4864 035362  012737  000340  177776          MOV #340,@#PSW                  ;SWITCH BACK TO KERNEL MODE BEFORE HALT
4865 035370  000000                          HALT                            ;CIS INSTRUCTION SHOULD HAVE ABORTED BUT DIDN'T
4866
4867 035372  004767  000240          1$:     JSR PC,RESR                     ;RESTOERE REGISTERS
4868 035376  062700  000002                  ADD #2,R0                       ;UPDATE PROTECTION SCHEME TO NEXT TABLE CASE
4869 035402  005710                          TST (R0)                        ;ANY CASES LEFT TO TRY?
4870 035404  001351                          BNE 2$                          ;BRANCH IF YES
4871
4872 035406  005037  177572                  CLR @#MMR0                      ;NO - PREPARE TO EXIT TEST
4873 035412  012737  177406  172204          MOV #177406,@#SIPDR2            ;RESTORE R/W ACCESS TO STACK AREA
4874 035420  000400                          BR UMTSTS                       ;GO TO NEXT TEST
4875
4876
4877                                 ;USER MODE CIS STACK PROBEAHEAD MEM MGMT ABORT SUBTEST
4878                                 ;
4879
4880 035422                          UMTSTS:
4881 035422  012737  035564  000250          MOV #MMHDLR,@#MMVEC             ;SETUP MEM MGMT INTERRRUPT VECTOR
4882 035430  012737  140340  000252          MOV #140340,@#MMVEC+2
4883 035436  012701  035522                  MOV #1$,R1                      ;SETUP INTR RETURN ADDRESS
4884 035442  012700  035706                  MOV #PDRTAB,R0
4885 035446  012737  140340  177776          MOV #140340,@#PSW               ;SWITCH TO USER MODE
4886 035454  012706  060070                  MOV #60070,SP
4887
4888 035460  011037  177604          2$:     MOV (R0),@#UIPDR2               ;PROTECT PART OF STACK
4889 035464  012737  000001  177572          MOV #1,@#MMR0                   ;TURN ON MEMORY MGMT
4890
4891 035472  004767  000106                  JSR PC,SAVR                     ;SAVE REGISTERS
4892
4893 035476  076130                          MOVCI                           ;EXECUTE THE CIS INSTRUCTION
4894 035500  035574                          SRC.PTR
4895 035502  035600                          DST.PTR
4896 035504  000377                          FILL
4897
4898 035506  000240                          NOP
4899 035510  000240                          NOP
4900 035512  012737  000340  177776          MOV #340,@#PSW                  ;SWITCH BACK TO KERNEL MODE BEFORE HALT
4901 035520  000000                          HALT                            ;CIS INSTRUCTION SHOULD HAVE ABORTED BUT DIDN'T
4902
4903 035522  004767  000110          1$:     JSR PC,RESR                     ;RESTORE REGISTERS
4904 035526  062700  000002                  ADD #2,R0                       ;UPDATE PROTECTION SCHEME TO NEXT TABLE CASE
4905 035532  005710                          TST (R0)                        ;ANY CASES LEFT TO TRY?
4906 035534  001351                          BNE 2$                          ;BRANCH IF YES
4907
4908 035536  005037  177572                  CLR @#MMR0                      ;NO - PREPARE TO EXIT TEST
4909 035542  012737  177406  177604          MOV #177406,@#UIPDR2            ;RESTORE R/W ACCESS TO STACK AREA
4910 035550  012737  000340  177776          MOV #340,@#PSW                  ;SWITCH BACK TO KERNEL MODE
```

```
4911 035556  016706  000122                  MOV STK1,SP                     ;RESTORE THE STACK POINTER
4912 035562  000471                          BR ENDABO                       ;GO TO NEXT TEST
4913
4914
4915
4916                                 ;MEMORY MANAGEMENT TRAP HANDLER
4917                                 ;
4918 035564                          MMHDLR:
4919 035564  005037  177572                  CLR @#MMR0                      ;TURN OFF MEM MGMT
4920 035570  022626                          CMP     (SP)+,(SP)+             ;FIX UP STACK
4921 035572  000111                          JMP (R1)                        ;RETURN VIA R1
4922
4923
4924
4925                                 ;CIS INSTRUCTION SOURCE AND DESTINATION DESCRIPTORS
4926                                 ;
4927 035574  000001                  SRC.PTR:        .WORD 1
4928 035576  076000                                  .WORD 76000
4929 035600  000001                  DST.PTR:        .WORD 1
4930 035602  076001                                  .WORD 76001
4931
4932                                 ;SUBROUTINES
4933                                 ;
4934 035604  010067  000060          SAVR:   MOV R0,SVR0                     ;SAVE REGISTERS
4935 035610  010167  000056                  MOV R1,SVR1
4936 035614  010267  000054                  MOV R2,SVR2
4937 035620  010367  000052                  MOV R3,SVR3
4938 035624  010467  000050                  MOV R4,SVR4
4939 035630  010567  000046                  MOV R5,SVR5
4940 035634  000207                        RTS PC
4941
4942 035636  016700  000026          RESR:   MOV SVR0,R0                     ;RESTORE REGISTERS
4943 035642  016701  000024                  MOV SVR1,R1
4944 035646  016702  000022                  MOV SVR2,R2
4945 035652  016703  000020                  MOV SVR3,R3
4946 035656  016704  000016                  MOV SVR4,R4
4947 035662  016705  000014                  MOV SVR5,R5
4948 035666  000207                        RTS PC
4949
4950 035670  000000                  SVR0:   .WORD 0
4951 035672  000000                  SVR1:   .WORD 0
4952 035674  000000                  SVR2:   .WORD 0
4953 035676  000000                  SVR3:   .WORD 0
4954 035700  000000                  SVR4:   .WORD 0
4955 035702  000000                  SVR5:   .WORD 0
4956
4957 035704  000000                  STK1:   .WORD 0
4958
4959
4960                                 ;PROTECTION TABLE  (WORD FORMAT = PDR FORMAT)
4961 035706                          PDRTAB:
4962 035706  177000                          177000          ;ACF=00         ED=0  PLF=176
4963 035710  177410                          177410          ;ACF=00         ED=1  PLF=177
4964 035712  177400                          177400          ;ACF=00         ED=0  PLF=177
4965 035714  100010                          100010          ;ACF=00         ED=1  PLF=0
4966
4967 035716  177002                          177002          ;ACF=01         ED=0  PLF=176
```

```
4968 035720  177412                        177412          ;ACF=01         ED=1  PLF=177
4969 035722  177402                        177402          ;ACF=01         ED=0  PLF=177
4970 035724  100012                        100012          ;ACF=01         ED=1  PLF=0
4971
4972 035726  177004                        177004          ;ACF=10         ED=0  PLF=176
4973 035730  177414                        177414          ;ACF=10         ED=1  PLF=177
4974 035732  177404                        177404          ;ACF=10         ED=0  PLF=177
4975 035734  100014                        100014          ;ACF=10         ED=1  PLF=0
4976
4977 035736  177006                        177006          ;ACF=11         ED=0  PLF=176
4978 035740  177416                        177416          ;ACF=11         ED=1  PLF=177
4979 035742  000000                        0
4980
4981
4982 035744  000000                        HALT            ;TEST SEQUENCE ERROR
4983 035746  000240                ENDABO: NOP
4984 035750  000240                        NOP
4985 035752  000240                        NOP
```

```
                                .SBTTL DIV USING DM4 REG 3
                                ;MODE 4 REG 3
```

```
4988                                    .SBTTL  TEST # 311 - DIV 0 52525 /-(3)=25252 REM=1 PS=0
                                        ;*****************************************************************************
                                        ;TEST 311 - DIV 0 52525 /-(3)=25252 REM=1 PS=0
                                        ;*****************************************************************************
     035754  005212                   TST311: INC     (R2)            ;UPDATE TEST NUMBER
     035756  022712  000311                   CMP     #311,(R2)       ;SEQUENCE ERROR?
     035762  001044                           BNE     TST312-10       ;BR TO ERROR HALT ON SEQ ERROR
4989 035764  005067  142006                   CLR     PS              ;CLEAR PS FROM LAST TEST
4990 035770  012700  000000                   MOV     #0,R0           ;LOAD HIGH ORDER WITH 0
4991 035774  012701  052525                   MOV     #52525,R1       ;LOAD LOW ORDER WITH 52525
4992 036000  012703  042552                   MOV     #S1+2,R3        ;SET UP R3
4993 036004  071043                           DIV     -(R3),R0                ;DIVIDE BY -(3)
4994 036006  013767  177776  004526           MOV     @#PS,SPSW       ;SAVE PS
4995 036014  122767  000000  004520           CMPB    #0,SPSW         ;IS PS=0
4996 036022  001406                           BEQ     1$
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 757           <====
     036024  012762  000713  177776           MOV     #713,-2(R2)     ;MOVE TO MAILBOX #  *******  713  *******
     036032  005262  177774                   INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     036036  000000                           HALT                    ;PS IS WRONG
4997 036040  022700  025252           1$:     CMP     #25252,R0       ;IS QUOTIENT =25252
4998 036044  001406                           BEQ     2$
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 746           <====
     036046  012762  000714  177776           MOV     #714,-2(R2)     ;MOVE TO MAILBOX #  *******  714  *******
     036054  005262  177774                   INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     036060  000000                           HALT                    ;QUOTIENT IS WRONG
4999 036062  022701  000001           2$:     CMP     #1,R1           ;IS REMAINDER =1
5000 036066  001406                           BEQ     TST312
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 735           <====
     036070  012762  000715  177776           MOV     #715,-2(R2)     ;MOVE TO MAILBOX #  *******  715  *******
     036076  005262  177774                   INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
     036102  000000                           HALT                    ;REMAINDER IS WRONG
                                                                       ;  OR SEQUENCE ERROR
5001                                    .SBTTL DIV USING DM5 REG 4
5002                                            ;MODE 5 REG 4
```

```
5003                                    .SBTTL  TEST # 312 - DIV 0 52525 /@-(4)=25252 REM=1 PS=0
                                        ;*****************************************************************************
                                        ;TEST 312 - DIV 0 52525 /@-(4)=25252 REM=1 PS=0
                                        ;*****************************************************************************
      036104  005212                  TST312: INC     (R2)            ;UPDATE TEST NUMBER
      036106  022712  000312                  CMP     #312,(R2)       ;SEQUENCE ERROR?
      036112  001042                          BNE     TST313-10       ;BR TO ERROR HALT ON SEQ ERROR
5004  036114  012700  000000                  MOV     #0,R0           ;LOAD HIGH ORDER WITH 0
5005  036120  012701  052525                  MOV     #52525,R1       ;LOAD LOW ORDER WITH 52525
5006  036124  012704  042554                  MOV     #S2+2,R4                ;SET UP R4
5007  036130  071054                          DIV     @-(R4),R0       ;DIVIDE BY @-(4)
5008  036132  013767  177776  004402          MOV     @#PS,SPSW       ;SAVE PS
5009  036140  122767  000000  004374          CMPB    #0,SPSW         ;IS PS = 0
5010  036146  001406                          BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 761           <====
      036150  012762  000716  177776          MOV     #716,-2(R2)     ;MOVE TO MAILBOX #  *******  716  *******
      036156  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      036162  000000                          HALT                    ;PS IS WRONG
5011  036164  022700  025252          1$:     CMP     #25252,R0       ;IS QUOTIENT =25252
5012  036170  001406                          BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 750           <====
      036172  012762  000717  177776          MOV     #717,-2(R2)     ;MOVE TO MAILBOX #  *******  717  *******
      036200  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      036204  000000                          HALT                    ;QUOTIENT IS WRONG
5013  036206  022701  000001          2$:     CMP     #1,R1           ;IS REMAINDER =1
5014  036212  001406                          BEQ     TST313
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 737           <====
      036214  012762  000720  177776          MOV     #720,-2(R2)     ;MOVE TO MAILBOX #  *******  720  *******
      036222  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      036226  000000                          HALT                    ;REMAINDER IS WRONG
                                                                      ;  OR SEQUENCE ERROR
5015
5016                                                    ;MODE 5 REG 4
```

```
5017                                    .SBTTL  TEST # 313 - DIV 0 52525 /@-(R4)=100000 REM=0 PS=2
                                        ;*****************************************************************************
                                        ;TEST 313 - DIV 0 52525 /@-(R4)=100000 REM=0 PS=2
                                        ;*****************************************************************************
036230  005212                          TST313: INC     (R2)            ;UPDATE TEST NUMBER
036232  022712  000313                          CMP     #313,(R2)       ;SEQUENCE ERROR?
036236  001042                                  BNE     TST314-10       ;BR TO ERROR HALT ON SEQ ERROR
5018 036240  012700  052525                    MOV     #52525,R0       ;LOAD HIGH ORDER WITH 52525
5019 036244  012704  042554                    MOV     #S2+2,R4                ;SET UP R4
5020 036250  012701  000000                    MOV     #0,R1           ;LOAD LOW ORDER WITH 0
5021 036254  071054                            DIV     @-(R4),R0       ;DIVIDE BY @-(4)
5022 036256  013767  177776  004256            MOV     @#PS,SPSW       ;SAVE PS
5023 036264  122767  000002  004250            CMPB    #2,SPSW         ;IS PS=0
5024 036272  001406                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 761           <====
036274  012762  000721  177776                MOV     #721,-2(R2)     ;MOVE TO MAILBOX #  *******  721  *******
036302  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
036306  000000                                HALT                    ;PS IS WRONG
5025 036310  022700  052525          1$:       CMP     #52525,R0       ;IS QUOTIENT =52525
5026 036314  001406                            BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 750           <====
036316  012762  000722  177776                MOV     #722,-2(R2)     ;MOVE TO MAILBOX #  *******  722  *******
036324  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
036330  000000                                HALT                    ;QUOTIENT IS WRONG
5027 036332  022701  000000          2$:       CMP     #0,R1           ;IS REMAINDER =0
5028 036336  001406                            BEQ     TST314
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 737           <====
036340  012762  000723  177776                MOV     #723,-2(R2)     ;MOVE TO MAILBOX #  *******  723  *******
036346  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
036352  000000                                HALT                    ;REMAINDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
5029
5030                                    .SBTTL DIV USING DM2 REG 7
5031                                            ;MODE 2 REG 7
```

```
5032                                    .SBTTL  TEST # 314 - DIV -1 -4/#2= -2 REM=0 PS=10
                                        ;*****************************************************************************
                                        ;TEST 314 - DIV -1 -4/#2= -2 REM=0 PS=10
                                        ;*****************************************************************************
036354  005212                        TST314: INC     (R2)            ;UPDATE TEST NUMBER
036356  022712  000314                        CMP     #314,(R2)       ;SEQUENCE ERROR?
036362  001041                              BNE     TST315-10       ;BR TO ERROR HALT ON SEQ ERROR
5033 036364  012700  177777                 MOV     #-1,R0          ;LOAD HIGH ORDER WITH -1
5034 036370  012701  177774                 MOV     #-4,R1  ;LOAD LOW ORDER WITH -4
5035 036374  071027  000002                 DIV     #2,R0           ;DIVIDE BY #2
5036 036400  013767  177776  004134         MOV     @#PS,SPSW       ;SAVE PS
5037 036406  122767  000010  004126         CMPB    #10,SPSW                ;IS PS =10
5038 036414  001406                        BEQ     1$
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 762           <====
036416  012762  000724  177776              MOV     #724,-2(R2)     ;MOVE TO MAILBOX #  *******  724  *******
036424  005262  177774                      INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
036430  000000                            HALT                    ;PS IS WRONG
5039 036432  022700  177776         1$:    CMP     #-2,R0          ;IS QUOTIENT = -2
5040 036436  001406                        BEQ     2$
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 751           <====
036440  012762  000725  177776              MOV     #725,-2(R2)     ;MOVE TO MAILBOX #  *******  725  *******
036446  005262  177774                      INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
036452  000000                            HALT                    ;QUOTIENT IS WRONG
5041 036454  022701  000000         2$:    CMP     #0,R1           ;IS REMAINDER =0
5042 036460  001406                        BEQ     TST315
                                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                    ;           CONDITIONAL BRANCH INST. AND   <====
                                                                    ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                    ;           WHICH FOLLOWS W/ 740           <====
036462  012762  000726  177776              MOV     #726,-2(R2)     ;MOVE TO MAILBOX #  *******  726  *******
036470  005262  177774                      INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
036474  000000                            HALT                    ;REMAINDER IS WRONG
                                                                    ;  OR SEQUENCE ERROR
5043
5044                                                    ;MODE 2 REG 7
```

```
5045                                    .SBTTL  TEST # 315 - DIV 0 0/ #1 = 0 REM=0 PS=4
                                        ;*****************************************************************************
                                        ;TEST 315 - DIV 0 0/ #1 = 0 REM=0 PS=4
                                        ;*****************************************************************************
      036476  005212                    TST315: INC     (R2)            ;UPDATE TEST NUMBER
      036500  022712  000315                    CMP     #315,(R2)       ;SEQUENCE ERROR?
      036504  001041                            BNE     TST316-10       ;BR TO ERROR HALT ON SEQ ERROR
5046  036506  012700  000000                    MOV     #0,R0           ;LOAD HIGH ORDER WITH 0
5047  036512  012701  000000                    MOV     #0,R1           ;LOAD LOW ORDER WITH 0
5048  036516  071027  000001                    DIV     #1,R0           ;DIVIDE BY #1
5049  036522  013767  177776  004012            MOV     @#PS,SPSW       ;SAVE PS
5050  036530  122767  000004  004004            CMPB    #4,SPSW         ;IS PS =4
5051  036536  001406                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 762           <====
      036540  012762  000727  177776            MOV     #727,-2(R2)     ;MOVE TO MAILBOX #  *******  727  *******
      036546  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      036552  000000                            HALT                    ;PS IS WRONG
5052  036554  022700  000000            1$:     CMP     #0,R0           ;IS QUOTIENT =0
5053  036560  001406                            BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 751           <====
      036562  012762  000730  177776            MOV     #730,-2(R2)     ;MOVE TO MAILBOX #  *******  730  *******
      036570  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      036574  000000                            HALT                    ;QUOTIENT IS WRONG
5054  036576  022701  000000            2$:     CMP     #0,R1           ;IS REMAINDER =0
5055  036602  001406                            BEQ     TST316
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 740           <====
      036604  012762  000731  177776            MOV     #731,-2(R2)     ;MOVE TO MAILBOX #  *******  731  *******
      036612  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      036616  000000                            HALT                    ;REMAINDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR

5056
5057                                                    ;MODE 2 REG 7
```

```
5058                                    .SBTTL  TEST # 316 - DIV 0 52525 / #2=25252 REM=1 PS=0
                                        ;*****************************************************************************
                                        ;TEST 316 - DIV 0 52525 / #2=25252 REM=1 PS=0
                                        ;*****************************************************************************
      036620  005212                  TST316: INC     (R2)            ;UPDATE TEST NUMBER
      036622  022712  000316                  CMP     #316,(R2)       ;SEQUENCE ERROR?
      036626  001041                          BNE     TST317-10       ;BR TO ERROR HALT ON SEQ ERROR
5059  036630  012700  000000                  MOV     #0,R0           ;LOAD HIGH ORDER WITH 0
5060  036634  012701  052525                  MOV     #52525,R1       ;LOAD LOW ORDER WITH 52525
5061  036640  071027  000002                  DIV     #2,R0           ;DIVIDE BY #2
5062  036644  013767  177776  003670          MOV     @#PS,SPSW       ;SAVE PS
5063  036652  122767  000000  003662          CMPB    #0,SPSW         ;IS PS =0
5064  036660  001406                          BEQ     1$
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                      ;           WHICH FOLLOWS W/ 762           <====
      036662  012762  000732  177776          MOV     #732,-2(R2)     ;MOVE TO MAILBOX #  *******  732  *******
      036670  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      036674  000000                          HALT                    ;PS IS WRONG
5065  036676  022700  025252          1$:     CMP     #25252,R0       ;IS QUOTIENT =25252
5066  036702  001406                          BEQ     2$
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                      ;           WHICH FOLLOWS W/ 751           <====
      036704  012762  000733  177776          MOV     #733,-2(R2)     ;MOVE TO MAILBOX #  *******  733  *******
      036712  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      036716  000000                          HALT                    ;QUOTIENT IS WRONG
5067  036720  022701  000001          2$:     CMP     #1,R1           ;IS REMAINDER =1
5068  036724  001406                          BEQ     TST317
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                      ;           WHICH FOLLOWS W/ 740           <====
      036726  012762  000734  177776          MOV     #734,-2(R2)     ;MOVE TO MAILBOX #  *******  734  *******
      036734  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      036740  000000                          HALT                    ;REMAINDER IS WRONG
                                                                      ;  OR SEQUENCE ERROR
5069
5070                                                    ;MODE 2 REG 7
```

```
5071                                    .SBTTL  TEST # 317 - DIV 25253 0 / #125252=100000 REM=0 PS=10
                                        ;*****************************************************************************
                                        ;TEST 317 - DIV 25253 0 / #125252=100000 REM=0 PS=10
                                        ;*****************************************************************************
036742  005212                  TST317: INC     (R2)            ;UPDATE TEST NUMBER
036744  022712  000317                  CMP     #317,(R2)       ;SEQUENCE ERROR?
036750  001041                          BNE     TST320-10       ;BR TO ERROR HALT ON SEQ ERROR
5072 036752  012700  025253            MOV     #25253,R0       ;LOAD HIGH ORDER WITH 25253
5073 036756  012701  000000            MOV     #0,R1           ;LOAD LOW ORDER WITH 0
5074 036762  071027  125252            DIV     #125252,R0      ;DIVIDE BY #125252
5075 036766  013767  177776  003546    MOV     @#PS,SPSW       ;SAVE PS
5076 036774  122767  000010  003540    CMPB    #10,SPSW                ;IS PS =10
5077 037002  001406                    BEQ     1$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 762           <====
037004  012762  000735  177776          MOV     #735,-2(R2)     ;MOVE TO MAILBOX #  *******  735  *******
037012  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
037016  000000                          HALT                    ;PS IS WRONG
5078 037020  022700  100000      1$:    CMP     #100000,R0      ;IS QUOTIENT =100000
5079 037024  001406                    BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 751           <====
037026  012762  000736  177776          MOV     #736,-2(R2)     ;MOVE TO MAILBOX #  *******  736  *******
037034  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
037040  000000                          HALT                    ;QUOTIENT IS WRONG
5080 037042  022701  000000      2$:    CMP     #0,R1           ;IS REMAINDER =0
5081 037046  001406                    BEQ     TST320
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 740           <====
037050  012762  000737  177776          MOV     #737,-2(R2)     ;MOVE TO MAILBOX #  *******  737  *******
037056  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
037062  000000                          HALT                    ;REMAINDER IS WRONG
                                                                ;  OR SEQUENCE ERROR
5082                                                    ;MODE 2 REG 7
```

```
5083                                    .SBTTL  TEST # 320 - DIV -1 -1 / #-1=1 REM=0 PS=0
                                        ;*****************************************************************************
                                        ;TEST 320 - DIV -1 -1 / #-1=1 REM=0 PS=0
                                        ;*****************************************************************************
037064  005212                  TST320: INC     (R2)            ;UPDATE TEST NUMBER
037066  022712  000320                  CMP     #320,(R2)       ;SEQUENCE ERROR?
037072  001041                          BNE     TST321-10       ;BR TO ERROR HALT ON SEQ ERROR
5084 037074  012700  177777            MOV     #-1,R0          ;LOAD HIGH ORDER WITH -1
5085 037100  012701  177777            MOV     #-1,R1  ;LOAD LOW ORDER WITH -1
5086 037104  071027  177777            DIV     #-1,R0          ;DIVIDE BY #-1
5087 037110  013767  177776  003424    MOV     @#PS,SPSW       ;SAVE PS
5088 037116  122767  000000  003416    CMPB    #0,SPSW         ;IS PS =0
5089 037124  001406                    BEQ     1$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 762           <====
037126  012762  000740  177776          MOV     #740,-2(R2)     ;MOVE TO MAILBOX #  *******  740  *******
037134  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
037140  000000                          HALT                    ;PS IS WRONG
5090 037142  022700  000001      1$:    CMP     #1,R0           ;IS QUOTIENT =1
5091 037146  001406                    BEQ     2$
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 751           <====
037150  012762  000741  177776          MOV     #741,-2(R2)     ;MOVE TO MAILBOX #  *******  741  *******
037156  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
037162  000000                          HALT                    ;QUOTIENT IS WRONG
5092 037164  022701  000000      2$:    CMP     #0,R1           ;IS REMAINDER =0
5093 037170  001406                    BEQ     TST321
                                                                ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                ;           CONDITIONAL BRANCH INST. AND   <====
                                                                ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                ;           WHICH FOLLOWS W/ 740           <====
037172  012762  000742  177776          MOV     #742,-2(R2)     ;MOVE TO MAILBOX #  *******  742  *******
037200  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
037204  000000                          HALT                    ;REMAINDER IS WRONG
                                                                ;  OR SEQUENCE ERROR
5094
5095                                                    ;MODE 2 REG 7
```

```
5096                                    .SBTTL  TEST # 321 - DIV 0 177777/#0=0 REM=0 PS=3
                                        ;*****************************************************************************
                                        ;TEST 321 - DIV 0 177777/#0=0 REM=0 PS=3
                                        ;*****************************************************************************
037206  005212                        TST321: INC     (R2)            ;UPDATE TEST NUMBER
037210  022712  000321                        CMP     #321,(R2)       ;SEQUENCE ERROR?
037214  001022                                BNE     TST322-10       ;BR TO ERROR HALT ON SEQ ERROR
5097 037216  012704  177777                   MOV     #177777,R4              ;LOAD HIGH ORDER WITH 177777
5098 037222  012705  000000                   MOV     #0,R5   ;LOAD LOW ORDER WITH 0
5099 037226  071427  000000                   DIV     #0,R4           ;DIVIDE BY #2
5100 037232  013767  177776  003302          MOV     @#PS,SPSW       ;SAVE PS
5101 037240  042767  000014  003274          BIC     #14,SPSW
5102 037246  122767  000003  003266          CMPB    #3,SPSW         ;IS PS =3
5103 037254  001406                          BEQ     TST322
                                                                      ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                      ;           CONDITIONAL BRANCH INST. AND   <====
                                                                      ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                      ;           WHICH FOLLOWS W/ 757           <====
037256  012762  000743  177776                  MOV     #743,-2(R2)     ;MOVE TO MAILBOX #  *******  743  *******
037264  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
037270  000000                                  HALT                    ;PS IS WRONG
                                                                        ;  OR SEQUENCE ERROR
5104
5105                                            ;MODE 2 REG 7
```

TEST # 322 - DIV 0 100000 00000 /#100000 REM=0 PS=2

```
5106                                    .SBTTL  TEST # 322 - DIV 0 100000 00000 /#100000 REM=0 PS=2
                                        ;*****************************************************************************
                                        ;TEST 322 - DIV 0 100000 00000 /#100000 REM=0 PS=2
                                        ;*****************************************************************************
      037272  005212                  TST322: INC     (R2)            ;UPDATE TEST NUMBER
      037274  022712  000322                  CMP     #322,(R2)       ;SEQUENCE ERROR?
      037300  001022                          BNE     TST323-10       ;BR TO ERROR HALT ON SEQ ERROR
5107  037302  012704  100000                  MOV     #100000,R4      ;LOAD HIGH ORDER WITH 100000
5108  037306  012705  000000                  MOV     #0,R5   ;LOAD LOW ORDER WITH 0
5109  037312  071427  000002                  DIV     #2,R4           ;DIVIDE BY #2
5110  037316  013767  177776  003216          MOV     @#PS,SPSW       ;SAVE PS
5111  037324  042767  000014  003210          BIC     #14,SPSW
5112  037332  122767  000002  003202          CMPB    #2,SPSW         ;IS PS=2
5113  037340  001406                          BEQ     TST323
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 757           <====
      037342  012762  000744  177776          MOV     #744,-2(R2)     ;MOVE TO MAILBOX #  *******  744  *******
      037350  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      037354  000000                          HALT                    ;PS IS WRONG
                                                                        ;  OR SEQUENCE ERROR
5114
5115                                                    ;MODE 2 REG 7
```

```
5116                                    .SBTTL  TEST # 323 - DIV 0 77777/#0=0 REM=0 PS=3
                                        ;*****************************************************************************
                                        ;TEST 323 - DIV 0 77777/#0=0 REM=0 PS=3
                                        ;*****************************************************************************
                                        TST323: INC     (R2)            ;UPDATE TEST NUMBER
 037356  005212                                 CMP     #323,(R2)       ;SEQUENCE ERROR?
 037360  022712  000323                         BNE     TST324-10       ;BR TO ERROR HALT ON SEQ ERROR
 037364  001061
5117 037366  012704  000000                     MOV     #0,R4           ;LOAD HIGH ORDER WITH 0
5118 037372  012705  077777                     MOV     #77777,R5       ;LOAD LOW ORDER WITH 77777
5119 037376  071427  000000                     DIV     #0,R4           ;DIVIDE BY 0
5120 037402  013767  177776  003132             MOV     @#PS,SPSW       ;SAVE PS
5121 037410  042767  000014  003124             BIC     #14,SPSW
5122 037416  122767  000003  003116             CMPB    #3,SPSW         ;IS PS =3
5123 037424  001434                             BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 757           <====
 037426  012762  000745  177776                 MOV     #745,-2(R2)     ;MOVE TO MAILBOX #  *******  745  *******
 037434  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 037440  000000                                 HALT                    ;PS IS WRONG
5124
5125 037442  012704  000000                     MOV     #0,R4           ;LOAD HIGH ORDER WITH 0
5126 037446  012705  077777                     MOV     #77777,R5       ;LOAD LOW ORDER WITH 77777
5127 037452  071427  000000                     DIV     #0,R4           ;DIVIDE BY 0
5128 037456  013767  177776  003056             MOV     @#PS,SPSW       ;SAVE PS
5129 037464  042767  000014  003050             BIC     #14,SPSW
5130 037472  122767  000003  003042             CMPB    #3,SPSW         ;IS PS =3
5131 037500  001417                             BEQ     TST324
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 731           <====
 037502  012762  000746  177776                 MOV     #746,-2(R2)     ;MOVE TO MAILBOX #  *******  746  *******
 037510  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 037514  000000                                 HALT                    ;PS IS WRONG
                                                                        ;  OR SEQUENCE ERROR
5132
5133 037516  022705  077777             2$:     CMP     #77777,R5               ;IS REMAINDER =1
5134 037522  001406                             BEQ     TST324
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 720           <====
 037524  012762  000747  177776                 MOV     #747,-2(R2)     ;MOVE TO MAILBOX #  *******  747  *******
 037532  005262  177774                         INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 037536  000000                                 HALT                    ;REMAINDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
5135
5136                                                    ;MODE 2 REG 7
```

```
5137                                    .SBTTL  TEST # 324 - DIV 25253 0 / #125252=100000 REM=0 PS=10
                                        ;*****************************************************************************
                                        ;TEST 324 - DIV 25253 0 / #125252=100000 REM=0 PS=10
                                        ;*****************************************************************************
                                        TST324: INC     (R2)            ;UPDATE TEST NUMBER
037540  005212                                  CMP     #324,(R2)       ;SEQUENCE ERROR?
037542  022712  000324                          BNE     TST325-10       ;BR TO ERROR HALT ON SEQ ERROR
037546  001041
5138 037550  012700  025253                     MOV     #25253,R0       ;LOAD HIGH ORDER WITH 25253
5139 037554  012701  000000                     MOV     #0,R1           ;LOAD LOW ORDER WITH 0
5140 037560  071027  125252                     DIV     #125252,R0      ;DIVIDE BY #125252
5141 037564  013767  177776  002750             MOV     @#PS,SPSW       ;SAVE PS
5142 037572  122767  000010  002742             CMPB    #10,SPSW        ;IS PS =10
5143 037600  001406                             BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 762           <====
037602  012762  000750  177776                  MOV     #750,-2(R2)     ;MOVE TO MAILBOX #  *******  750  *******
037610  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
037614  000000                                  HALT                    ;PS IS WRONG
5144 037616  022700  100000             1$:     CMP     #100000,R0      ;IS QUOTIENT =100000
5145 037622  001406                             BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 751           <====
037624  012762  000751  177776                  MOV     #751,-2(R2)     ;MOVE TO MAILBOX #  *******  751  *******
037632  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
037636  000000                                  HALT                    ;QUOTIENT IS WRONG
5146 037640  022701  000000             2$:     CMP     #0,R1           ;IS REMAINDER =0
5147 037644  001406                             BEQ     TST325
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 740           <====
037646  012762  000752  177776                  MOV     #752,-2(R2)     ;MOVE TO MAILBOX #  *******  752  *******
037654  005262  177774                          INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
037660  000000                                  HALT                    ;REMAINDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
5148                                            ;MODE 2 REG 7
```

```
5149                                    .SBTTL  TEST # 325 - DIV -1 -1 /#-1=1 REM=0 PS=0
                                        ;*****************************************************************************
                                        ;TEST 325 - DIV -1 -1 /#-1=1 REM=0 PS=0
                                        ;*****************************************************************************
 037662  005212                        TST325: INC     (R2)            ;UPDATE TEST NUMBER
 037664  022712  000325                        CMP     #325,(R2)       ;SEQUENCE ERROR?
 037670  001041                                BNE     TST326-10       ;BR TO ERROR HALT ON SEQ ERROR
5150 037672  012700  177777                    MOV     #-1,R0          ;LOAD HIGH ORDER WITH -1
5151 037676  012701  177777                    MOV     #-1,R1          ;LOAD LOW ORDER WITH -1
5152 037702  071027  177777                    DIV     #-1,R0          ;DIVIDE BY #-1
5153 037706  013767  177776  002626            MOV     @#PS,SPSW       ;SAVE PS
5154 037714  122767  000000  002620            CMPB    #0,SPSW         ;IS PS =0
5155 037722  001406                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 762           <====
 037724  012762  000753  177776                MOV     #753,-2(R2)     ;MOVE TO MAILBOX #  *******  753  *******
 037732  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 037736  000000                                HALT                    ;PS IS WRONG
5156 037740  022700  000001            1$:     CMP     #1,R0           ;IS QUOTIENT =1
5157 037744  001406                            BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 751           <====
 037746  012762  000754  177776                MOV     #754,-2(R2)     ;MOVE TO MAILBOX #  *******  754  *******
 037754  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 037760  000000                                HALT                    ;QUOTIENT IS WRONG
5158 037762  022701  000000            2$:     CMP     #0,R1           ;IS REMAINDER =0
5159 037766  001406                            BEQ     TST326
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 740           <====
 037770  012762  000755  177776                MOV     #755,-2(R2)     ;MOVE TO MAILBOX #  *******  755  *******
 037776  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 040002  000000                                HALT                    ;REMAINDER IS WRONG
                                                                        ;  OR SEQUENCE ERROR
5160                                                    ;MODE 2 REG 7
```

```
5161                                    .SBTTL  TEST # 326 - DIV 0 177777/#0=0 REM=0 PS=3
                                        ;*****************************************************************************
                                        ;TEST 326 - DIV 0 177777/#0=0 REM=0 PS=3
                                        ;*****************************************************************************
                                        TST326: INC     (R2)            ;UPDATE TEST NUMBER
 040004  005212                                CMP     #326,(R2)       ;SEQUENCE ERROR?
 040006  022712  000326                        BNE     TST327-10       ;BR TO ERROR HALT ON SEQ ERROR
 040012  001022                                MOV     #177777,R4      ;LOAD HIGH ORDER WITH 177777
5162 040014  012704  177777                    MOV     #0,R5           ;LOAD LOW ORDER WITH 0
5163 040020  012705  000000                    DIV     #0,R4           ;DIVE BY #2
5164 040024  071427  000000                    MOV     @#PS,SPSW       ;SAVE PS
5165 040030  013767  177776  002504            BIC     #14,SPSW
5166 040036  042767  000014  002476            CMPB    #3,SPSW         ;IS PS =3
5167 040044  122767  000003  002470            BEQ     TST327
5168 040052  001406                                                    ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 757           <====
 040054  012762  000756  177776                MOV     #756,-2(R2)     ;MOVE TO MAILBOX #  *******  756  *******
 040062  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 040066  000000                                HALT                    ;PS IS WRONG
                                                                       ;  OR SEQUENCE ERROR
5169                                                    ;MODE 2 REG 7
```

TEST # 327 - DIV 0 100000 000000 /#2=100000 REM=0 PS=2

```
5170                                    .SBTTL  TEST # 327 - DIV 0 100000 000000 /#2=100000 REM=0 PS=2
                                        ;*****************************************************************************
                                        ;TEST 327 - DIV 0 100000 000000 /#2=100000 REM=0 PS=2
                                        ;*****************************************************************************
040070  005212                        TST327: INC     (R2)            ;UPDATE TEST NUMBER
040072  022712  000327                        CMP     #327,(R2)       ;SEQUENCE ERROR?
040076  001022                                BNE     TST330-10       ;BR TO ERROR HALT ON SEQ ERROR
5171 040100  012704  100000                    MOV     #100000,R4      ;LOAD HIGH ORDER WITH 100000
5172 040104  012705  000000                    MOV     #0,R5           ;LOAD LOW ORDER WITHO
5173 040110  071427  000002                    DIV     #2,R4           ;DIVIDE BY #2
5174 040114  013767  177776  002420           MOV     @#PS,SPSW       ;SAVE PS
5175 040122  042767  000014  002412           BIC     #14,SPSW
5176 040130  122767  000002  002404           CMPB    #2,SPSW         ;IS PS=2
5177 040136  001406                            BEQ     TST330
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 757           <====
040140  012762  000757  177776                MOV     #757,-2(R2)     ;MOVE TO MAILBOX #  *******  757  *******
040146  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
040152  000000                                HALT                    ;PS IS WRONG
                                                                        ;  OR SEQUENCE ERROR
5178                                                    ;MODE 2 REG 7
```

```
 5179                                   .SBTTL  TEST # 330 - DIV 0 77777 /#0=0 REM=0 PS=3
                                        ;*****************************************************************************
                                        ;TEST 330 - DIV 0 77777 /#0=0 REM=0 PS=3
                                        ;*****************************************************************************
 040154  005212                        TST330: INC     (R2)            ;UPDATE TEST NUMBER
 040156  022712  000330                        CMP     #330,(R2)       ;SEQUENCE ERROR?
 040162  001022                                BNE     TST331-10       ;BR TO ERROR HALT ON SEQ ERROR
 5180 040164  012704  000000                   MOV     #0,R4           ;LOAD HIGH ORDER WITH 0
 5181 040170  012705  077777                   MOV     #77777,R5       ;LOAD LOW ORDER WITH 77777
 5182 040174  071427  000000                   DIV     #0,R4           ;DIVIDE BY 0
 5183 040200  013767  177776  002334          MOV     @#PS,SPSW       ;SAVE PS
 5184 040206  042767  000014  002326          BIC     #14,SPSW
 5185 040214  122767  000003  002320          CMPB    #3,SPSW         ;IS PS =3
 5186 040222  001406                          BEQ     TST331
                                                                       ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                       ;           CONDITIONAL BRANCH INST. AND   <====
                                                                       ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                       ;           WHICH FOLLOWS W/ 757           <====
 040224  012762  000760  177776                MOV     #760,-2(R2)     ;MOVE TO MAILBOX #  *******  760  *******
 040232  005262  177774                        INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
 040236  000000                                HALT                    ;PS IS WRONG
                                                                       ;  OR SEQUENCE ERROR
```

```
 5187                                   .SBTTL  TEST # 331 - TEST SUB INSTRUCTION MODES 2-7
                                        ;*****************************************************************************
                                        ;TEST 331 - TEST SUB INSTRUCTION MODES 2-7
                                        ;*****************************************************************************
      040240  005212                    TST331: INC     (R2)            ;UPDATE TEST NUMBER
      040242  022712  000331                    CMP     #331,(R2)       ;SEQUENCE ERROR?
      040246  001113                            BNE     TST332-10       ;BR TO ERROR HALT ON SEQ ERROR
 5188 040250  012700  177777                    MOV     #-1,R0          ;SETUP SOURCE TO -1
 5189 040254  010037  040336                    MOV     R0,@#2$+2       ;SET MODE 2 TO LOCATION TO A -1
 5190 040260  012701  042546                    MOV     #SUBT+2,R1      ;SET R1 TO POINT TO BUFFER AREA +2
 5191 040264  012761  177777  177776           MOV     #-1,-2(R1)      ;PUT -1 OP INTO DEST. BUFFER AREA
 5192 040272  160041                            SUB     R0,-(R1)        ;MODE-4 SUB SOURCE MODE 0 DEST MODE 4
 5193 040274  001406                            BEQ     1$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 764           <====
      040276  012762  000761  177776           MOV     #761,-2(R2)     ;MOVE TO MAILBOX #  *******  761  *******
      040304  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      040310  000000                            HALT                    ;SUB -1 FROM -1 FAILED TO GIVE ZERO RESULT IN MODE 4
 5194 040312  022701  042544            1$:     CMP     #SUBT,R1        ;VARIFY AUTO-DECREMENT OF R1 IN MODE 4 WORKED
 5195 040316  001406                            BEQ     2$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 753           <====
      040320  012762  000762  177776           MOV     #762,-2(R2)     ;MOVE TO MAILBOX #  *******  762  *******
      040326  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      040332  000000                            HALT                    ;R1 FAILED  TO DECEREMENT IN  MODE 4
 5196 040334  160027  177777            2$:     SUB     R0,#-1          ;IF PROC HALTS AT PC=32650 THEN AUTO INC MODE FAILED
 5197 040340  001406                            BEQ     3$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 742           <====
      040342  012762  000763  177776           MOV     #763,-2(R2)     ;MOVE TO MAILBOX #  *******  763  *******
      040350  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      040354  000000                            HALT                    ;SUB -1 FROM -1 FAILED TO GIVE ZERO RESULT
 5198 040356  012711  177777            3$:     MOV     #-1,(R1)        ;RESET SUBT TO A -1
 5199 040362  160037  042544                    SUB     R0,@#SUBT       ;SET MODE-3
 5200 040366  001406                            BEQ     4$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 727           <====
      040370  012762  000764  177776           MOV     #764,-2(R2)     ;MOVE TO MAILBOX #  *******  764  *******
      040376  005262  177774                    INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
      040402  000000                            HALT                    ;SUB -1 FROM -1 FAILED TO GIVE A ZERO RESULT
 5201 040404  012703  042550            4$:     MOV     #SUBT+4,R3      ;SETUP FOR MODE 5
 5202 040410  012711  177777                    MOV     #-1,(R1)        ;RESET SUBT TO A 1-
 5203 040414  160053                            SUB     R0,@-(R3)       ;SUB -1 FROM -1 USING MODE-5
 5204 040416  001406                            BEQ     5$
                                                                        ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                        ;           CONDITIONAL BRANCH INST. AND   <====
                                                                        ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                        ;           WHICH FOLLOWS W/ 713           <====
      040420  012762  000765  177776           MOV     #765,-2(R2)     ;MOVE TO MAILBOX #  *******  765  *******
```

```
        040426  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        040432  000000                           HALT                    ;SUB -1 FROM -1 FAILED TO GIVE ZERO RESULT
 5205   040434  012711  177777          5$:     MOV     #-1,(R1)        ;RESET SUBT TO A -1
 5206   040440  160061  000000                  SUB     R0,0(R1)        ;MODE-6
 5207   040444  001406                          BEQ     6$
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                         ;           CONDITIONAL BRANCH INST. AND   <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                         ;           WHICH FOLLOWS W/ 700           <====
        040446  012762  000766  177776          MOV     #766,-2(R2)     ;MOVE TO MAILBOX #  *******  766  *******
        040454  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        040460  000000                          HALT                    ;SUB -1 FROM -1 FAILED TO GIVE ZERO RESULT
 5208   040462  010011          6$:     MOV     R0,(R1)         ;RESET SUBT TO A -1
 5209   040464  160071  000002                  SUB     R0,@2(R1)       ;MODE-7
 5210   040470  001406                          BEQ     TST332
                                                                         ; TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
                                                                         ;           CONDITIONAL BRANCH INST. AND   <====
                                                                         ;           REPLACE THE MOVE INSTRUCTION   <====
                                                                         ;           WHICH FOLLOWS W/ 666           <====
        040472  012762  000767  177776          MOV     #767,-2(R2)     ;MOVE TO MAILBOX #  *******  767  *******
        040500  005262  177774                  INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
        040504  000000                          HALT                    ;SUB -1 FROM -1 FAILED TO GIVE ZERO RESULT
                                                                         ;  OR SEQUENCE ERROR
```

```
5211                                    .SBTTL  TEST # 332 - TEST RTI  KERNAL/USER  MODE MICRO FLOW
                                        ;*****************************************************************************
                                        ;TEST 332 - TEST RTI  KERNAL/USER  MODE MICRO FLOW
                                        ;*****************************************************************************
040506  005212                          TST332: INC     (R2)                    ;UPDATE TEST NUMBER
040510  022712  000332                          CMP     #332,(R2)               ;SEQUENCE ERROR?
040514  001043                                  BNE     TST333-10               ;BR TO ERROR HALT ON SEQ ERROR
5212 040516  012706  001000                    MOV     #STBOT,R6               ;SETUP KERNAL STACK
5213 040522  012767  140000  137246            MOV     #USRM,PS                ;SETUP USER MODE
5214 040530  012706  042402                    MOV     #USTBOT,R6              ;SETUP USER  STACK POINTER
5215 040534  012746  140000                    MOV     #USRM,-(SP)             ;PUSH USER R6 ON STACK
5216 040540  012746  040546                    MOV     #REN,-(SP)              ;SETUP RETURN ADDRESS
5217 040544  000002                            RTI
5218 040546  022767  140000  137222  REN:     CMP     #140000,PS              ;CHECK PSW
5219 040554  001411                            BEQ     1$
5220 040556  042767  140000  137212            BIC     #USRM,PS                ;CLEAR USER MODE
5221 040564  012762  000770  177776            MOV     #770,-2(R2)             ;MOVE TO MAILBOX #  *******  770  *******
040572  005262  177774                          INC     -4(R2)                  ;SET MSGTYP TO FATAL ERROR
040576  000000                                  HALT                            ;USER MODE DID NOT SET
5222 040600  042767  140000  137170  1$:      BIC     #USRM,PS                ;SET KERNAL MODE
5223 040606  012746  000340                    MOV     #340,-(SP)              ;SET LEVEL 7
5224 040612  012746  040634                    MOV     #TST333,-(SP)
5225 040616  000002                            RTI
5226 040620  012762  000771  177776            MOV     #771,-2(R2)             ;MOVE TO MAILBOX #  *******  771  *******
040626  005262  177774                          INC     -4(R2)                  ;SET MSGTYP TO FATAL ERROR
040632  000000                                  HALT                            ;RTI DID NOT HAPPEN
5227
5228                                            ;*****************************************************************
5229                                    ;*      THIS TEST IS OPTIONAL AND IS SELECTED BY SETTING MFM HARDWARE
5230                                    ;*      SWITCH REGISTER BIT 08 TO A 1 IN THE CASE OF STANDALONE OPERATION
5231                                    ;*      OF THE DIAGNOSTIC. IN THE CASE OF MANUFACTURING APT RUNTIME MODE
5232                                    ;*      THEN BIT 08 OF $SWREG IS SET TO 1 THRU APT SCRIPTING.
5233
5234                                    ;*      TEST DESCRIPTION:
5235                                    ;*      THIS TEST VERIFIES THAT THE SWITCH REGISTER SELECT SIGNAL IS
5236                                    ;*      ISSUED FROM THE CPU DATA PATH MODULE TO THE MFM MODULE.  WHEN
5237                                    ;*      THE HARDWARE SWITCH REGISTER IS READ, THE ADDRESS OF THE SWITCH
523                                     ;*      REGISTER IS DECODED ON THE CPU DATA PATH CAUSING THE 'SR SELECT'
523                                     ;*      SIGNAL TO BE ISSUED TO THE MFM. THE MFM USES THIS SIGNAL TO PLACE
524                                     ;*      THE REGISTER CONTENTS ONTO THE PAX DATA BUS. CONTENTS OF THE SWITCH
5241                                    ;*      REGISTER OTHER THAN ALL 1'S SHOULD BE READ.(THERE IS A
5242                                    ;*      HI PROBABILITY THAT IF THE 'SR SELECT' SIGNAL IS NOT ISSUED
5243                                    ;*      ALL 1'S WILL BE READ ON PAX DATA.) IT IS ASSUMED THAT DATA OTHER
5244                                    ;*      THAN ALL 1'S IS LOCATED IN HARDWARE SWITCH REGISTER .
5245
```

```
5246                                    .SBTTL  TEST # 333 - SWITCH REGISTER SELECT TEST
                                        ;*****************************************************************************
                                        ;TEST 333 - SWITCH REGISTER SELECT TEST
                                        ;*****************************************************************************
040634  005212                  TST333: INC     (R2)            ;UPDATE TEST NUMBER
040636  022712  000333                  CMP     #333,(R2)       ;SEQUENCE ERROR?
040642  001022                          BNE     TST334-10       ;BR TO ERROR HALT ON SEQ ERROR
5247
5248 040644  132767  000200  137447      BITB    #200,$ENVM      ;IS APT SIZING?
5249 040652  001405                      BEQ     4$              ;NO;TRY HARDWARE SWITCH REGISTER
5250 040654  032767  000400  137440      BIT     #400,$SWREG     ;YES APT IS SIZING;DOES APT SAY TO DO
5251                                                              ;THIS TEST
5252 040662  001413                      BEQ     10$             ;NO;SKIP TEST
5253 040664  000404                      BR      1$              ;YES,DO TEST
5254 040666  032737  000400  177570  4$: BIT     #400,@#177570   ;DOES HARDWARE SWITCH REGISTER SAY TO
5255                                                              ;TO DO TEST?
5256 040674  001406                      BEQ 10$                 ;NO,SKIP TEST
5257
5258 040676  013700  177570          1$: MOV     @#177570,R0     ;READ HARDWARE SWITCH REGISTER CONTENTS
5259                                                              ;AND SAVE IN R0
5260 040702  022700  177777              CMP     #-1,R0          ;WERE ALL 1'S RECEIVED
5261 040706  001001                      BNE 10$                 ;NO,TEST PASSES
5262 040710  000000                      HALT                    ;'SR SELECT' ERROR OR SEQUENCE ERROR
5263                                                              ;ALL 1'S WERE RECEIVED WHEN HARDWARE SWITCH
5264                                                              ;REGISTER WAS READ. THIS INDICATES THAT THE
5265                                                              ;THE SWITCH REGISTER CONTENTS WAS NOT PUT ON
5266                                                              ;THE PAX DATA LINES AS A RESULT OF THE 'SR SELECT'
5267                                                              ;SIGNAL BEING RECEIVED BY THE MFM FROM THE
5268                                                              ;CPU DATA PATH MODULE
5269 040712  000240                 10$: NOP                     ;END OF TEST
5270 040714  000240                      NOP
5271 040716  000240                      NOP
5272
5273
5274                                                          ;*****************************************************************
5275                                    ;*    THIS TEST IS OPTIONAL AND IS SELECTED BY SETTING MFM HARDWARE
5276                                    ;*    SWITCH REGISTER BIT 08 TO A 1 IN THE CASE OF STANDALONE OPERATION
5277                                    ;*    OF THE DIAGNOSTIC. IN THE CASE OF MANUFACTURING APT RUNTIME MODE
5278                                    ;*    THEN BIT 08 OF $SWREG IS SET TO 1 THRU APT SCRIPTING.
5279                                    ;*
5280                                    ;*    THIS TEST VERIFIES THE CACHE RESTART SIGNAL ON THE CPU CONTROL
5281                                    ;*    MODULE ISSUED FROM  THE CACHE.
5282                                    ;*
5283                                    ;*    THIS TEST ASSUMES THAT ALL MODULES EXCEPT THE CPU DATA PATH/CONTROL
5284                                    ;*    STORE ARE KNOWN GOOD MODULES.
5285
5286
5287                                    ;*    THIS TEST TOGETHER WITH OTHER CACHE TESTS,ALLOW MFG. TO ELIMINATE
5288                                    ;*    HAVING TO RUN THE CACHE DIAGNOSTIC DURING QUICK
5289                                    ;*    VERIFY TESTING  OF THE CPU MODULE.
5290                                    ;*    TEST DESCRIPTION:
5291                                    ;*    VERIFY THAT A CACHE READ HIT WILL RESULT IN DATA BEING READ
5292                                    ;*    FROM CACHE DATA STORE, ASSURING THAT THE CACHE HAS ISSUED A
5293                                    ;*    A CPU CLOCK RESTART SIGNAL.  ASSURE THAT ALL 0'S CAN BE CACHED
5294                                    ;*    OUT OF CACHE DATA STORE.
5295                                    ;*
```

```
5296                                    .SBTTL  TEST # 334 - CACHE RESTART SIGNAL TEST
                                        ;*****************************************************************************
                                        ;TEST 334 - CACHE RESTART SIGNAL TEST
                                        ;*****************************************************************************
 040720  005212                        TST334: INC     (R2)                    ;UPDATE TEST NUMBER
 040722  022712  000334                        CMP     #334,(R2)               ;SEQUENCE ERROR?
 040726  001115                                BNE     TST335-10               ;BR TO ERROR HALT ON SEQ ERROR
5297 040730  132767  000200  137363            BITB    #200,$ENVM              ;IS APT SIZING?
5298 040736  001405                            BEQ     4$                      ;NO;TRY HARDWARE SWITCH REGISTER
5299 040740  032767  000400  137354            BIT     #400,$SWREG             ;YES APT IS SIZING;DOES APT SAY TO DO
5300                                                                            ;THIS TEST
5301 040746  001506                            BEQ     10$                     ;NO;SKIP TEST
5302 040750  000404                            BR      1$                      ;YES,DO TEST
5303 040752  032737  000400  177570  4$:       BIT     #400,@#177570           ;DOES HARDWARE SWITCH REGISTER SAY TO
5304                                                                            ;TO DO TEST?
5305 040760  001501                            BEQ 10$                         ;NO,SKIP TEST
5306
5307 040762                            1$:
5308
5309 040762  012701  040000                    MOV      #40000,R1              ;ADDRESS 40000 TO R1
5310 040766  012705  060000                    MOV      #60000,R5              ;ADDRESS 60000 TO R5
5311 040772  012737  041056  000014            MOV      #3$,@#14               ;SETUP BPT TRAP VECTORS
5312 041000  012737  000340  000016            MOV      #340,@#16
5313 041006  005003                            CLR      R3                     ;CLEAR ERROR FLAGS
5314 041010  005004                            CLR      R4
5315 041012  012706  060002                    MOV      #60002,R6              ;STACK POINTER NOW POINTS TO ADDRESS 60002
5316 041016  005037  060000                    CLR      @#60000                ;PRECONDITION MAIN MEMORY ADDRESS LOCATION
5317                                                                            ;60000 WITH ALL 0'S
5318 041022  012767  000340  136746            MOV      #340,PS                ;PRECONDITION PS TO 340
5319 041030  112737  000002  177750            MOVB     #2,@#177750            ;'HIT ON DESTINATION ONLY'(HODO)  ALLOWS
5320                                                                            ;CACHE  UPDATES AND HITS
5321                                                                            ;ONLY DURING THE DESTINATION MEMORY ACCESS
5322                                                                            ;OF AN INSTRUCTION.
5323 041036  012737  000011  177746            MOV      #11,@#177746           ;NO BYPASS TO ALLOW WRITES TO CACHE STORES.
5324                                                                            ;ENABLE LOW CACHE
5325 041044  000257                            CCC                             ;CLEAR ALL CONDITION CODES
5326 041046  005711                            TST      (R1)                   ;
5327 041050  005715                            TST      (R5)                   ;CACHE READ UPDATE. WRITE ALL 0'S FROM
5328                                                                            ;MAIN MEMORY LOCATION TO CACHE DATA STORE
5329                                                                            ;LOCATION 0000.
5330 041052  000003                            BPT                             ;BREAKPOINT TRAP. DUE TO A TRAP,THE  PSW
5331                                                                            ;WILL BE WRITTEN TO THE STACK, WHICH NOW
5332                                                                            ;POINTS TO ADDRESS 60000.THE TRAP INSTRUCTION
5333                                                                            ;IS A NON-DESTINATION ACCESS INSTR.THEREFORE,
5334                                                                            ;SINCE HODO IS BEING USED, A CACHE UPDATE
5335                                                                            ;WILL BE INHIBITED. MAIN MEMORY
5336                                                                            ;ADDRESS 60000 WILL CONTAIN PSW  DATA OF 344,AND
5337                                                                            ;THE LOCATION IN CACHE CORRESPONDING TO ADDRESS
5338                                                                            ;60000 WILL BE LEFT WITH ALL 0'S DATA.
5339
5340 041054  000000                            HALT                            ;BPT TRAP DID NOT OCCUR
5341
5342 041056  042737  000002  177750  3$:       BIC      #2,@#177750           ;TRAP TO HERE;DISABLE HODO
5343 041064  011500                            MOV      (R5),R0                ; WHEN THIS INSTRUCTION READS
5344                                                                            ;ADDRESS 60000
5345                                                                            ;A CACHE READ HIT SHOULD RESULT AND A CPU CLOCK
5346                                                                            ;RESTART SIGNAL SHOULD BE ISSUED.
```

```
5347                                                    ;THE CPU SHOULD READ DATA FROM CACHE DATA STORE
5348                                                    ;RATHER THAN MAIN MEMORY.
5349 041066  000240                        NOP
5350 041070  000240                        NOP
5351 041072  005700                        TST     R0          ;R0 SHOULD CONTAIN ALL 0'S
5352 041074  001406                        BEQ     7$          ;
5353 041076  022700  000344                CMP     #344,R0     ;DID THE CPU READ MAIN MEMORY?
5354 041102  001002                        BNE     6$          ;NO,MUST HAVE READ CACHE BUT BAD DATA WAS RECEIVED.
5355 041104  005203                        INC     R3          ;INDICATE ERROR THAT MAIN MEMORY WAS READ
5356 041106  000401                        BR      7$
5357 041110  005204              6$:       INC     R4          ;INDICATE ERROR THAT DATA WAS CACHED BUT
5358                                                    ;BAD DATA WAS RECEIVED.
5359 041112  105037  177750      7$:       CLRB    @#177750    ;DISABLE MAINTENANCE MODE
5360 041116  012737  000000  177746        MOV     #0,@#177746 ;TURN ON CACHE
5361 041124  012706  001000                MOV     #STBOT,R6   ;RESET STACK POINTER
5362 041130  012737  042432  000014        MOV     #T014,@#14  ;RESTORE BPT VECTORS
5363 041136  005037  000016                CLR     @#16
5364 041142  005703                        TST     R3          ;WAS MAIN MEMORY READ?
5365 041144  001402                        BEQ     8$          ;NO
5366 041146  000000                        HALT                ;ERROR
5367                                                    ;CPU CLOCK RESTART-CACHED DATA TESTS
5368
5369                                                    ;ATTEMPTING TO CAUSE A READ HIT IN ORDER TO
5370                                                    ;CACHE DATA RESULTED IN MAIN MEMORY BEING READ
5371 041150  000405                        BR      10$         ;NEXT TEST
5372 041152  005704              8$:       TST     R4          ;WAS BAD DATA CACHED FROM CACHE DATA STORE?
5373 041154  001403                        BEQ     10$         ;NO, NEXT TEST
5374 041156  000000                        HALT                ;ERROR
5375                                                    ;CPU CLOCK RESTART-CACHED DATA TESTS
5376
5377                                                    ;CREATING A READ HIT BY READING ADDRESS 60000
5378                                                    ;CACHED BAD DATA FROM CACHE DATA STORE
5379 041160  000401                BR      10$
5380 041162  000000                HALT                ;SEQUENCE ERROR
5381 041164  000402        10$:    BR      .+6
5382 041166  000240                NOP
5383 041170  000240                NOP
5384
5385                                                    ;*****************************************************************
5386                                            ;*      THIS TEST IS OPTIONAL AND IS SELECTED BY SETTING MFM HARDWARE
5387                                            ;*      SWITCH REGISTER BIT 08 TO A 1 IN THE CASE OF STANDALONE OPERATION
5388                                            ;*      OF THE DIAGNOSTIC. IN THE CASE OF MANUFACTURING APT RUNTIME MODE
5389                                            ;*      THEN BIT 08 OF $SWREG IS SET TO 1 THRU APT SCRIPTING.
5390                                            ;*
5391                                            ;*      THIS TEST VERIFIES
5392                                            ;*      THE CPU CONTROL SIGNAL TO THE CACHE WHICH INDICATES THAT AN ACCESS
5393                                            ;*      TO THE UNIBUS IS BEING PERFORMED(PA TOP 128K L).
5394                                            ;*
5395                                            ;*      THIS TEST ASSUMES THAT ALL MODULES OTHER THAN CPU CONTROL/DATA PATH
5396                                            ;*      ARE KNOWN GOOD MODULES.
5397
5398                                            ;*      THIS TEST TOGETHER WITH OTHER CACHE TESTS,ALLOW MFG. TO ELIMINATE
5399                                            ;*      HAVING TO RUN THE CACHE DIAGNOSTIC DURING QUICK
5400                                            ;*      VERIFY TESTING  OF THE CPU MODULE.
5401                                            ;*      TEST DESCRIPTION:
5402                                            ;*      VERIFY THAT THE CACHE WRITE CONTROL LOGIC WILL INHIBIT A CACHE
5403                                            ;*      READ UPDATE TO CACHE TAG STORE DUE TO AN ACCESS TO I/O PAGE.
```

```
5404                                    ;*
```

```
5405                                    .SBTTL  TEST # 335 - CACHE WRITE CONTROL LOGIC TEST
                                        ;*****************************************************************************
                                        ;TEST 335 - CACHE WRITE CONTROL LOGIC TEST
                                        ;*****************************************************************************
041172  005212                        TST335: INC     (R2)                    ;UPDATE TEST NUMBER
041174  022712  000335                        CMP     #335,(R2)               ;SEQUENCE ERROR?
041200  001051                                BNE     TST336-10               ;BR TO ERROR HALT ON SEQ ERROR
5406 041202  132767  000200  137111          BITB    #200,$ENVM              ;IS APT SIZING?
5407 041210  001405                          BEQ     4$                      ;NO;TRY HARDWARE SWITCH REGISTER
5408 041212  032767  000400  137102          BIT     #400,$SWREG             ;YES APT IS SIZING;DOES APT SAY TO DO
5409                                                                         ;THIS TEST
5410 041220  001442                          BEQ     10$                     ;NO;SKIP TEST
5411 041222  000404                          BR      1$                      ;YES,DO TEST
5412 041224  032737  000400  177570  4$:     BIT     #400,@#177570           ;DOES HARDWARE SWITCH REGISTER SAY TO
5413                                                                         ;TO DO TEST?
5414 041232  001435                          BEQ 10$                         ;NO,SKIP TEST
5415
5416 041234                              1$:
5417 041234  112737  000002  177750                  MOVB #2,@#177750        ;ALLOWS CACHE TAG FIELD BITS TO BE
5418                                                                         ;WRITTEN TO CHR<15:07> ONLY DURING
5419                                                                         ;THE DESTINATION MEMORY ACCESS
5420                                                                         ;OF AN INSTRUCTION
5421 041242  012737  000015  177746          MOV #15,@#177746        ;NO UCB SO AS TO WRITE ENABLE CACHE STORE
5422 041250  005737  057744                  TST @#57744
5423 041254  005737  077744                  TST @#77744             ;READ UPDATE;LOAD BIT PATTERN
5424                                                                 ;000000011 INTO TAG STORE LOCATION
5425                                                                 ;7762
5426 041260  005737  177744                  TST @#177744            ;ACCESS I/O PAGE BY READING CME REGISTER.
5427                                                                 ;THE CACHE COULD DO AN UPDATE TO
5428                                                                 ;TAG STORE LOCATION 7762 BUT THE ACCESS
5429                                                                 ;TO I/O PAGE WILL INHIBIT WRITE CONTROL
5430                                                                 ;LOGIC
5431 041264  005737  057744                  TST @#57744             ;WRITE TAG STORE DATA FROM  LOCATION
5432                                                                 ;7762 INTO CHR<15:07>.
5433 041270  013700  177752                  MOV @#177752,R0         ;SAVE CHR DATA
5434 041274  000240                          NOP
5435 041276  000240                          NOP
5436
5437 041300  105037  177750                  CLRB @#177750           ;DISABLE MAINTENANCE MODE
5438 041304  012737  000000  177746          MOV #0,@#177746         ;TURN ON CACHE
5439 041312  042700  000177                  BIC #177,R0             ;PREPARE R0 FOR ERROR CHECK
5440 041316  022700  000600                  CMP #600,R0             ;BITS 15:07 SHOULD BE BIT PATTERN 000000011
5441 041322  001401                          BEQ 10$                 ;PASS
5442 041324  000000                          HALT                    ;CACHE WRITE CONTROL CPU  LOGIC SIGNAL
5443                                                                 ;OR SEQUENCE ERROR
5444                                                                 ;READING TAG DATA BITS<21:13> THRU CACHE HIT REGISTE
5445                                                                 ;DID NOT RESULT IN BIT PATTERN 000000011.
5446                                                                 ;THIS INDICATES THAT A READ UPDATE
5447                                                                 ;MAY HAVE OCCURED TO CACHE TAG STORE
5448                                                                 ;DUE TO AN ACCESS TO I/O PAGE
5449                                                                 ;R0 BITS 15:07 CONTAINS DATA RECEIVED
5450                                                                 ;FROM CACHE HIT REGISTER BITS 15:07
5451 041326  000240                      10$:    NOP             ;END OF TEST
5452 041330  000240                              NOP
5453 041332  000240                              NOP
5454                                    ;*****************************************************************
5455                                ;*  THIS TEST IS OPTIONAL AND IS SELECTED BY SETTING MFM HARDWARE
```

```
                                ;*      SWITCH REGISTER BIT 08 TO A 1 IN THE CASE OF STANDALONE OPERATION
                                ;*      OF THE DIAGNOSTIC. IN THE CASE OF MANUFACTURING APT RUNTIME MODE
                                ;*      THEN BIT 08 OF $SWREG IS SET TO 1 THRU APT SCRIPTING.
                                ;*
                                ;*      THIS TEST VERIFIES
                                ;*      THE CACHE BYPASS SIGNAL GENERATED FROM THE CPU TO THE CACHE(CACHE BYPASS L).
                                ;*      THIS SIGNAL IS GENERATED WHEN THE ASRB INSTRUCTION IS EXECUTED.
                                ;*
                                ;*      THIS TEST ASSUMES THAT ALL MODULES EXCEPT CPU DATA PATH/CONTROL STORE
                                ;*      ARE KNOWN GOOD MODULES.
                                ;*
                                ;*      THIS TEST TOGETHER WITH OTHER CACHE TESTS,ALLOW MFG. TO ELIMINATE
                                ;*      HAVING TO RUN THE CACHE DIAGNOSTIC DURING QUICK
                                ;*      VERIFY TESTING  OF THE CPU MODULE.
                                ;*      TEST DESCRIPTION:
                                ;*      VERIFY THAT THE ASRB INSTRUCTION WILL CAUSE A CACHE BYPASS
                                ;*      UNDER A READ HIT CONDITION.
                                ;*
```

```
 5475                                   .SBTTL  TEST # 336 - ASRB CACHE BYPASS TEST
                                        ;******************************************************************************
                                        ;TEST 336 - ASRB CACHE BYPASS TEST
                                        ;******************************************************************************
      041334  005212                    TST336: INC     (R2)            ;UPDATE TEST NUMBER
      041336  022712  000336                    CMP     #336,(R2)       ;SEQUENCE ERROR?
      041342  001043                            BNE     TST337-10       ;BR TO ERROR HALT ON SEQ ERROR
 5476 041344  132767  000200  136747          BITB    #200,$ENVM      ;IS APT SIZING?
 5477 041352  001405                            BEQ     4$              ;NO;TRY HARDWARE SWITCH REGISTER
 5478 041354  032767  000400  136740          BIT     #400,$SWREG     ;YES APT IS SIZING;DOES APT SAY TO DO
 5479                                                                   ;THIS TEST
 5480 041362  001434                            BEQ     10$             ;NO;SKIP TEST
 5481 041364  000404                            BR      1$              ;YES,DO TEST
 5482 041366  032737  000400  177570  4$:       BIT     #400,@#177570   ;DOES HARDWARE SWITCH REGISTER SAY TO
 5483                                                                   ;TO DO TEST?
 5484 041374  001427                            BEQ 10$                 ;NO,SKIP TEST
 5485
 5486 041376                            1$:
 5487 041376  012700  060000                        MOV #60000,R0           ;SETUP TEST LOCATION ADDRESS
 5488                                                                       ;IN R0
 5489 041402  112737  000002  177750              MOVB #2,@#177750        ;HODO ALLOWS READ HITS TO BE CACHED,CACHE UPDATES,AN
 5490                                                                       ;CLOCKING OF OUTPUT OF CACHE HIT NAND
 5491                                                                       ;GATE INTO CMR ONLY DURING THE DESTINATION
 5492                                                                       ;ACCESS OF AN INSTRUCTION.
 5493 041410  012737  000011  177746              MOV #11,@#177746        ;NO UCB SO AS TO WRITE CACHE STORES
 5494                                                                       ;ENABLE LOW CACHE FOR A READ HIT
 5495 041416  005710                            TST (R0)                ;READING LOCATION SPECIFIED BY R0
 5496                                                                       ;WILL ASSURE A READ HIT WHEN THE
 5497                                                                       ;LOCATION IS READ AGAIN
 5498 041420  106210                            ASRB (R0)               ;ASRB INSTRUCTION WILL CAUSE A BYPASS
 5499                                                                       ;TO OCCUR INHIBITING A READ HIT
 5500                                                                       ;TO LOCATION SPECIFIED BY R0.
 5501                                                                       ;THIS SITUATION WILL RESULT IN CMR
 5502                                                                       ;BIT 8 BEING A 1.
 5503 041422  013701  177750                        MOV @#177750,R1         ;SAVE CMR CONTENTS
 5504 041426  000240                                NOP
 5505 041430  000240                                NOP
 5506 041432  105037  177750                        CLRB @#177750           ;DISABLE MAINT MODE
 5507 041436  012737  000000  177746                MOV #0,@#177746         ;TURN ON CACHE
 5508 041444  032701  000400                        BIT #400,R1             ;WAS CMR BIT 8 A 1
 5509 041450  001001                                BNE 10$                 ;PASS
 5510 041452  000000                                HALT                    ;CACHE BYPASS DID NOT OCCUR OR
 5511                                                                       ;SEQUENCE ERROR
 5512                                                                       ;READING OUTPUT OF CACHE HIT NAND GATE
 5513                                                                       ;THRU CMR<8> DID NOT RESULT IN A 1
 5514 041454  000240                    10$:        NOP             ;END OF TEST
 5515 041456  000240                                NOP
 5516 041460  000240                                NOP
 5517
 5518
 5519                                   ;*************************************************************
 5520                           ;*      THIS TEST IS OPTIONAL AND IS SELECTED BY SETTING MFM HARDWARE
 5521                           ;*      SWITCH REGISTER BIT 08 TO A 1 IN THE CASE OF STANDALONE OPERATION
 5522                           ;*      OF THE DIAGNOSTIC. IN THE CASE OF MANUFACTURING APT RUNTIME MODE
 5523                           ;*      THEN BIT 08 OF $SWREG IS SET TO 1 THRU APT SCRIPTING.
 5524
 5525                           ;*      THIS TEST VERIFIES THE MICROCODE IN THE CPU CONTROL STORE ASSOCIATED
```

```
                        ;*      WITH THE CIS INSTRUCTION SET. IT IS ASSUMED THAT ALL MODULES EXCEPT
                        ;*      THE CPU DATA PATH AND CONTROL MODULE ARE ALL 'KNOWN GOOD MODULES'.
                        ;*
                        ;*      THIS TEST ALLOWS MFG. TO ELIMINATE
                        ;*      HAVING TO RUN THE CIS DIAGNOSTIC DURING QUICK
                        ;*      VERIFY TESTING  OF THE CPU MODULE.
                        ;*
                        ;*      TEST DESCRIPTION:
                        ;*      THE CPU MPC MICROADDRESSES ASSOCIATED WITH THE CPU ARE
                        ;*      740 THRU 776. IT HAS BEEN DETERMINED THAT BY EXECUTING THIS TEST
                        ;*      ALL BUT MPC ADDRESS 772 AND 773 ARE COVERED.
```

```
5538                                    .SBTTL  TEST # 337 - CIS CPU MPC ADDRESS COVERAGE TEST
                                        ;*****************************************************************************
                                        ;TEST 337 - CIS CPU MPC ADDRESS COVERAGE TEST
                                        ;*****************************************************************************
                                        ;
                                        TST337: INC     (R2)            ;UPDATE TEST NUMBER
041462  005212                                  CMP     #337,(R2)       ;SEQUENCE ERROR?
041464  022712  000337                          BNE     TST340-10       ;BR TO ERROR HALT ON SEQ ERROR
041470  001101                                  BITB    #200,$ENVM      ;IS APT SIZING?
5539 041472  132767  000200  136621            BEQ     4$              ;NO;TRY HARDWARE SWITCH REGISTER
5540 041500  001405                            BIT     #400,$SWREG     ;YES APT IS SIZING;DOES APT SAY TO DO
5541 041502  032767  000400  136612                                    ;THIS TEST
5542                                    BEQ     ENDMPC          ;NO;SKIP TEST
5543 041510  001472                            BR      1$              ;YES,DO TEST
5544 041512  000404                    4$:     BIT     #400,@#177570   ;DOES HARDWARE SWITCH REGISTER SAY TO
5545 041514  032737  000400  177570                                    ;TO DO TEST?
5546                                    BEQ     ENDMPC          ;NO,SKIP TEST
5547 041522  001465
5548                                    1$:     MOV     #2$,@#10                ;SETUP FOR POSSIBLE TRAP
5549 041524  012737  041562  000010            MOV     #340,@#12
5550 041532  012737  000340  000012            76001                   ;THIS CIS INSTRUCTION  SHOULD CAUSE A TRAP
5551 041540  076001                                                      ;TO OCCUR TO VECTOR 10 INDICATING THAT
5552                                                                    ;SWITCH S1 OF CIS M7092 DATA PATH MODULE
5553                                                                    ;IS OPEN. THE SWITCH MUST BE OPEN TO ALLOW
5554                                                                    ;THIS TEST TO RUN.
5555
5556 041542  000240                            NOP
5557 041544  012737  042416  000010            MOV     #T010,@#10      ;RESTORE VECTORS
5558 041552  005037  000012                    CLR     @#12
5559 041556  000000                            HALT                    ;CHECK TO SEE THAT SWITCH S1 OF M7092 CIS DATA
5560                                                                    ;PATH MODULE IS OPEN.
5561
5562 041560  000406                            BR      5$
5563 041562  022626                    2$:     CMP     (SP)+,(SP)+     ;READJUST STACK
5564 041564  012737  042416  000010            MOV     #T010,@#10      ;RESTORE VECTORS
5565 041572  005037  000012                    CLR     @#12
5566
5567 041576  076150                    5$:     ADDNI                   ;;NOW PERFORM CIS INSTRUCTION WHICH WILL
5568                                                                    ;COVER MOST OF THE CPU MPC MICROADDRESSES
5569 041600  041610                            .WORD   A
5570 041602  041614                            .WORD   B
5571 041604  041620                            .WORD   D
5572
5573 041606  000414                            BR      CHECK           ;NOW CHECK RESULTS
5574
5575         076150                            ADDNI=76150
5576 041610  000006                    A:      .WORD   6
5577 041612  041624                            .WORD   SA
5578 041614  000006                    B:      .WORD   6
5579 041616  041624                            .WORD   SA
5580 041620  000006                    D:      .WORD   6
5581 041622  041632                            .WORD   DA
5582 041624  001002                    SA:     .WORD   1002
5583 041626  001002                            .WORD   1002
5584 041630  031002                            .WORD   31002
5585 041632  000000                    DA:     .WORD   0
5586 041634  000000                            .WORD   0
5587 041636  000000                            .WORD   0
5588
```

```
5589 041640                                CHECK:
5590 041640  022737  032064  041632               CMP     #32064,@#DA     ;CHECK RESULTS
5591 041646  001401                               BEQ     6$              ;PASS
5592 041650  000000                               HALT                    ;ERROR
5593 041652  022737  032064  041634  6$:          CMP     #32064,@#DA+2   ;CHECK RESULT
5594 041660  001401                               BEQ     7$              ;PASS
5595 041662  000000                               HALT                    ;ERROR
5596 041664  022737  032064  041636  7$:          CMP     #32064,@#DA+4   ;CHECK RESULT
5597 041672  001401                               BEQ     ENDMPC          ;PASS
5598 041674  000000                               HALT                    ;CIS INSTUCTION OR SEQUENCE ERROR
5599
5600 041676  000240                     ENDMPC:   NOP
5601 041700  000240                               NOP
5602 041702  000240                               NOP
5603                                               .SBTTL  TEST #340 - CPU ERROR REGISTER BIT 0 CHECK
5604                                     ;*********************************************************************
5605                                     ;* TEST 340      CPU ERROR REGISTER BIT 0 CHECK
5606
5607 041704  005212                     TST340:   INC     (R2)            ;UPDATE TEST NUMBER
5608 041706  022712  000340                       CMP     #340,(R2)       ;SEQUENCE ERROR?
5609 041712  001004                               BNE     1$              ;BR TO ERROR HALT ON SEQ ERROR
5610 041714  032767  000001  136044               BIT     #BIT0,CPUERR    ;TEST BIT 0 OF THE CPU ERROR REGISTER (BIT 0 SET INDICATES
5611                                                                       ;1 OR MORE OF THE POWER SUPPLIES ARE OUT OF SPECIFICATION)
5612 041722  001411                               BEQ     ENDPAS          ;BRANCH IF FOUND CLEAR
5613                                                                       ;TO SCOPE: CLEAR THE RIGHT BYTE OF THIS   <====
5614                                                                       ;          CONDITIONAL BRANCH INST. AND   <====
5615                                                                       ;          REPLACE THE BIC INSTRUCTION    <====
5616                                                                       ;          WHICH FOLLOWS W/ 775           <====
5617 041724  012762  000772  177776  1$:       MOV     #772,-2(R2)     ;MOVE TO MAILBOX #  *********  772  ********
5618                                     ;*********IMPORTANT - CHANGE THE #772 ABOVE AS APPROPRIATE IF ANY ERRORS ARE EITHER
5619                                     ;          ADDED OR REMOVED.*************
5620 041732  005262  177774                       INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
5621 041736  000000                               HALT                    ;CPU BIT 0 IS SET OR TEST SEQUENCE ERROR
5622 041740  042767  000001  136020               BIC     #BIT0,CPUERR    ;CLEAR THE PWR MON BIT IN THE CPU ERROR REGISTER
```

```
                                ;*****************************************************************************
                                ;                       END OF PASS SEQUENCE
                                ;*****************************************************************************

041746  005212                ENDPASS:INC     (R2)            ;UPDATE TEST NUMBER
041750  022712  000341                CMP     #341,(R2)       ;SEQUENCE ERROR?
041754  001042                        BNE     EOP1            ;BR TO ERROR HALT ON SEQ ERROR
041756  005237  000306                INC     @#$PASS
041762  105267  000112                INCB    PASSPT          ;SHOULD PRINT THIS PASS?
041766  001033                        BNE     GOAGIN          ;NO
041770  132767  000040  136323        BITB    #40,$ENVM       ;WILL APT ALLOW PRINTING?
041776  001017                        BNE     ACT             ;NO
042000  023727  000042  042046        CMP     @#42,#$ENDAD    ;UNDER ACT AUTO ACCEPT?
042006  001413                        BEQ     ACT             ;IF SO SKIP PRINTOUT
042010  012700  042102                MOV     #MSG,R0         ;GET MSG ADDR.
042014  105737  177564        WAIT:   TSTB    @#TPS           ;TTY READY
042020  100375                        BPL     WAIT            ;NO WAIT
042022  121027  000377                CMPB    (R0),#377       ;IS NEXT CHAR. THE TERMINATOR
042026  001403                        BEQ     ACT             ;YES THEN BR
042030  112037  177566                MOVB    (R0)+,@#TPB     ;PRINT CHARACTER
042034  000767                        BR      WAIT            ;NEXT IF NOT DONE.
042036  013700  000042        ACT:    MOV     @#42,R0         ;CHECK ACT
042042  001405                        BEQ     GOAGIN          ;KEEP GOING
042044  000005                        RESET
042046  004710                $ENDAD: JSR     PC,(R0)         ;ACT HOOKS
042050  000240                        NOP
042052  000240                        NOP
042054  000240                        NOP
042056  000167  137040        GOAGIN: JMP     RESTRT          ;DO NEXT PASS
042062                        EOP1:
042062  012762  000772  177776        MOV     #772,-2(R2)     ;MOVE TO MAILBOX #  *******  772  *******
042070  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
042074  000000                        HALT                    ;SEQUENCE ERROR

042076  001100                        START

042100  177777                PASSPT: -1
042102    015     012     000 MSG:    .ASCII  <15><12><0><0><0><0><0><0>.END OF.
042105    000     000     000
042110    000     000     105
042113    116     104     040
042116    117     106
042120    040     040     103         .ASCII  .  CKKAABO 11/44 CPU/EIS.<0><0><0><377>
042123    113     113     101
042126    101     102     060
042131    040     061     061
042134    057     064     064
042137    040     103     120
042142    125     057     105
042145    111     123     000
042150    000     000     377

                                .EVEN
042154  000402                BRTAB:  BR      .+6
042156  001002                        BNE     .+6
042160  001402                        BEQ     .+6
042162  002002                        BGE     .+6
```

```
 5665 042164  002402                          BLT     .+6
 5666 042166  003002                          BGT     .+6
 5667 042170  003402                          BLE     .+6
 5668 042172  100002                          BPL     .+6
 5669 042174  100402                          BMI     .+6
 5670 042176  101002                          BHI     .+6
 5671 042200  101402                          BLOS    .+6
 5672 042202  102002                          BVC     .+6
 5673 042204  102402                          BVS     .+6
 5674 042206  103002                          BCC     .+6             ;SAME AS BHIS
 5675 042210  103402                          BCS     .+6             ;SAME AS BLO
 5676 042212  000000                          $TMP0:  .WORD 0
 5677 042214  000000                          $TMP1:  .WORD 0
 5678 042216  000000                          $TMP2:  .WORD 0
 5679 042220  000000                          $TMP3:  .WORD 0
 5680 042222  000000                          $EPIRQ: .WORD 0 ;ERROR PIRQ.
 5681 042224  000000                          $LPADR: .WORD 0
 5682 042226  000000                          $LPERR: .WORD 0 ;ERROR LOOP
 5683         000002                  .RADIX  2
 5684 042230  177777                  YNTAB:  1111111111111111        ;BR
 5685 042232  170360                          1111000011110000        ;BNE:  Z=0
 5686 042234  007417                          0000111100001111        ;BEQ:  Z=1
 5687 042236  146063                          1100110000110011        ;BGE:  N XOR V =0
 5688 042240  031714                          0011001111001100        ;BLT:  N XOR V =1
 5689 042242  140060                          1100000000110000        ;BGT:  Z+(N XOR V) =0
 5690 042244  037717                          0011111111001111        ;BLE:  Z+(N XOR V) =1
 5691
 5692 042246  177400                          1111111100000000        ;BPL:  N=0
 5693 042250  000377                          0000000011111111        ;BMI:  N=1
 5694 042252  120240                          1010000010100000        ;BHI:  C+Z=0
 5695 042254  057537                          0101111101011111        ;BLOS: C+Z=1
 5696 042256  146314                          1100110011001100        ;BVC:  V=0
 5697 042260  031463                          0011001100110011        ;BVS:  V=1
 5698 042262  125252                          1010101010101010        ;BCC:  C=0
 5699 042264  052525                          0101010101010101        ;BCS:  C=1
 5700         000010                  .RADIX  8
 5701
 5702 042266  012737  042276  000024  PWRDN:  MOV     #PWRUP,@#24             ;SET UP FOR A POWER UP
 5703 042274  000000                          HALT
 5704
 5705 042276  012737  042266  000024  PWRUP:  MOV     #PWRDN,@#24             ;SET UP FOR A POWER FAIL
 5706 042304  012706  001000                  MOV     #STBOT,R6               ;SET UP STACK POINTER
 5707 042310  132767  000040  136003          BITB    #40,$ENVM               ;SHOULD PRINT?
 5708 042316  001010                          BNE     PWR2                    ;IF NOT: BR
 5709 042320  012700  042344                  MOV     #PFMES,R0               ;GET POWER FAIL MESSG.
 5710 042324  105737  177564          WATE:   TSTB    @#TPS                   ;TTY READY?
 5711 042330  100375                          BPL     WATE                    ;IF NOT: BR
 5712 042332  112037  177566                  MOVB    (R0)+,@#TPB             ;PRINT NEXT CHAR.
 5713 042336  001372                          BNE     WATE                    ;IF NOT DONE:  BR
 5714 042340  000137  001100          PWR2:   JMP     @#START                 ;START PROGRAM AGAIN
 5715
 5716
 5717 042344     012     015     120  PFMES:  .ASCIZ  <12><15>.POWER FAILURE.<12><15>
      042347     117     127     105
      042352     122     040     106
      042355     101     111     114
      042360     125     122     105
```

```
        042363  012  015  000
5718                            .EVEN
5719 042366                     .BLKW   6
5720 042402                     USTBOT:
5721                            ;*****************************************************************************************
5722                            ; THE FOLLOWING ARE SPECIAL CPU TRAP
5723                            ;HANDLERS TO TRAP AND REPORT SPECIAL TRAPS.
5724                            ;
5725                            ;*****************************************************************************************
5726
5727 042402                     TO4:
       042402  012762  000773  177776        MOV     #773,-2(R2)     ;MOVE TO MAILBOX #  *******  773  *******
       042410  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
       042414  000000                        HALT                    ;TRAPPED THRU LOC. 4
5728 042416                     TO10:
       042416  012762  000774  177776        MOV     #774,-2(R2)     ;MOVE TO MAILBOX #  *******  774  *******
       042424  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
       042430  000000                        HALT                    ;TRAPPED THRU LOC. 10
5729 042432                     TO14:
       042432  012762  000775  177776        MOV     #775,-2(R2)     ;MOVE TO MAILBOX #  *******  775  *******
       042440  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
       042444  000000                        HALT                    ;TRAPPED THRU LOC. 14
5730 042446                     TO30:
       042446  012762  000776  177776        MOV     #776,-2(R2)     ;MOVE TO MAILBOX #  *******  776  *******
       042454  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
       042460  000000                        HALT                    ;TRAPPED THRU LOC. 30
5731 042462                     TO34:
       042462  012762  000777  177776        MOV     #777,-2(R2)     ;MOVE TO MAILBOX #  *******  777  *******
       042470  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
       042474  000000                        HALT                    ;TRAPPED THRU LOC. 34
5732 042476                     TO114:
       042476  012762  001000  177776        MOV     #1000,-2(R2)    ;MOVE TO MAILBOX #  *******  1000  *******
       042504  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
       042510  000000                        HALT                    ;TRAPPED THRU LOC. 114
5733 042512                     TO244:
       042512  012762  001001  177776        MOV     #1001,-2(R2)    ;MOVE TO MAILBOX #  *******  1001  *******
       042520  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
       042524  000000                        HALT                    ;TRAPPED THRU LOC. 244
5734 042526                     TO250:
       042526  012762  001002  177776        MOV     #1002,-2(R2)    ;MOVE TO MAILBOX #  *******  1002  *******
       042534  005262  177774                INC     -4(R2)          ;SET MSGTYP TO FATAL ERROR
       042540  000000                        HALT                    ;TRAPPED THRU LOC. 250
5735 042542  000000             SPSW:   0
5736 042544  000000             SUBT:   .WORD   0
5737 042546  042544             SUBT1:  .WORD   SUBT
5738 042550  000002             S1:     2
5739 042552  042550             S2:     S1
5740 042554  177771             S3:     -7
5741 042556  042554             S4:     S3
5742
5743 042560  000000             END:    0
5744         000001             .END
```

SYMBOL TABLE

```
A       041610
ABASE = 000000
ACDW1 = 000000
ACDW2 = 000000
ACPUOP= 000000
ACT     042036
ADC1    022764
ADC2    023000
ADC3    023020
ADC4    023034
ADC5    023052
ADDNI = 076150
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
ADD1    022554
ADD2    022570
ADD3    022604
ADD4    022620
ADD5    022636
ADD6    022652
ADD7    022664
ADD8    022700
ADD9    022720
ADEVCT= 000000
ADEVM = 000000
AENV  = 000000
AENVM = 000000
AFATAL= 000000
AMADR1= 000000
AMADR2= 000000
AMADR3= 000000
AMADR4= 000000
AMAMS1= 000000
AMAMS2= 000000
AMAMS3= 000000
AMAMS4= 000000
AMSGAD= 000000
AMSGLG= 000000
AMSGTY= 000000
AMTYP1= 000000
AMTYP2= 000000
AMTYP3= 000000
AMTYP4= 000000
APASS = 000000
APRIOR= 000000
AROUND  026646
ASL1    024454
ASL2    024470
ASL3    024506
ASL4    024522
ASL5    024536
ASL6    024552
ASL7    024576
ASR1    024644
ASR2    024660
ASR3    024702
ASR4    024716
ASR5    024732
ASR6    024746
ASR7    024776
ASWREG= 000000
ATESTN= 000000
AUNIT = 000000
AUSWR = 000000
AVECT1= 000000
AVECT2= 000000
B       041614
BIC1    021604
BIC2    021620
BIC3    021636
BIS1    021704
BIS2    021720
BIS3    021740
BITCHK  027042
BITCLR  026770
BITCON  027130
BITSET  027006
BIT0  = 000001
BIT00 = 000001
BIT01 = 000002
BIT02 = 000004
BIT03 = 000010
BIT04 = 000020
BIT05 = 000040
BIT06 = 000100
BIT07 = 000200
BIT08 = 000400
BIT09 = 001000
BIT1  = 000002
BIT10 = 002000
BIT11 = 004000
BIT12 = 010000
BIT13 = 020000
BIT14 = 040000
BIT15 = 100000
BIT2  = 000004
BIT3  = 000010
BIT4  = 000020
BIT5  = 000040
BIT6  = 000100
BIT7  = 000200
BIT8  = 000400
BIT9  = 001000
BPTVEC= 000014
BRCT    026710
BRC1    003700
BRC2    003714
BRC3    003724
BRH     026656
BRN1    003540
BRN2    003554
BRN3    003564
BRTAB   042154
BRV1    003620
BRV2    003634
BRV3    003644
BRZ1    003460
BRZ2    003474
BRZ3    003504
BR1     001172
BR2     001206
BR3     001224
BR4     001232
BR5     001246
BTCON   027210
BTERR   027170
CACHVE= 000114
CC      026652
CCERR   027440
CC1     027322
CC2     027336
CHECK   041640
CLRCD   027320
CLR1    022316
CMP1    023260
CMP2    023274
CMP3    023316
CMP4    023332
CMP5    023356
CMP6    023372
CMP7    023412
COM1    023456
CONT    026712
CONTRL= 177746
CON1    027356
CON2    027454
CPUERR= 177766
CR    = 000015
CRLF  = 000200
D       041620
DA      041632
DAERR   027114
DDISP = 177570
DEC1    022136
DEC2    022152
DEC3    022166
DEC4    022202
DEC5    022216
DEC6    022232
DEC7    022254
DISPRE  000174
DNMB0A  012320
DNMB0B  012334
DNMB2A  012612
DNMB2B  012626
DNMB2C  012646
DNMB2D  012662
DNMB2E  012676
DNMB2F  012720
DNMB3A  013006
DNMB3B  013022
DNMB3C  013044
DNMB3D  013062
DNMB3E  013076
DNMB4A  013306
DNMB4B  013322
DNMB4C  013344
DNMB4D  013354
DNMB4E  013370
DNMB4F  013410
DNM03A  011306
DNM03B  011322
DNM03C  011332
DNM1    011140
DNM1A   012406
DNM1B   012422
DNM2    011160
DNM2A   012474
DNM2B   012510
DNM2C   012516
DNM2D   012532
DNM3    011202
DNM4    011230
DNM4A   013164
DNM4B   013200
DNM4C   013220
DNM5A   013474
DNM5B   013510
DNM5C   013532
DNM6A   013616
DNM6B   013632
DNM6C   013654
DNM7A   013742
DNM7B   013756
DNM7C   014000
DOPB2A  011774
DOPB2B  012062
DOP0A   010646
DOP0B   010676
DOP0C   010722
DOP0D   010756
DOP03A  011040
DOP03B  011054
DOP1    011562
DOP2    011710
DOP4    015706
DOP5    015776
DST.PT  035600
DSWR  = 177570
EIS     030154
EMTVEC= 000030
END     042560
ENDABO  035746
ENDMPC  041676
ENDPAS  041746
EOP1    042062
ER      026670
ERROR = 104000
ERRVEC= 000004
FILL  = 000377
GOAGIN  042056
HIADRS= 177742
HITMIS= 177752
HT    = 000011
IJMP    020524
IJMP4   020246
IJMP5   020462
INC1    022004
INC2    022020
INC3    022042
INC4    022056
INC5    022072
IOTVEC= 000020
JMPCK   020526
JMPERR  027244
JMPSEQ  020552
JMPT    027234
JMP2    020250
JMP2A   020272
JMP3    020166
JMP3A   020210
JMP3B   020234
JMP4    020304
JMP4A   020326
JMP4B   020352
JMP5    020424
JMP5A   020450
JMP6    020364
JMP6A   020410
JMP7    020464
JMP7A   020510
JSRCK   021240
JSRCKA  021234
JSRCK1  021256
JSRSEQ  021236
JSR0    020566
JSR1    020572
JSR1A   020614
JSR2    020714
JSR2A   020744
JSR2B   020760
```

SYMBOL TABLE

```
JSR3     020630    MAPH00= 170202    MAPL2  = 170210    MDM7A   015506    NEG50   006556
JSR3A    020670    MAPH01= 170206    MAPL20= 170300    MDM7B   015522    NEG51   006572
JSR3B    020704    MAPH02= 170212    MAPL21= 170304    MDM7C   015544    NEG52   006612
JSR4     021002    MAPH03= 170216    MAPL22= 170310    MDM7D   015570    NEG60   006674
JSR4A    021020    MAPH04= 170222    MAPL23= 170314    MDM7E   015620    NEG61   006710
JSR4B    021034    MAPH05= 170226    MAPL24= 170320    MEMERR= 177744    NEG70   006764
JSR5     021116    MAPH06= 170232    MAPL25= 170324    MFPD0   027556    NEG71   007000
JSR5A    021142    MAPH07= 170236    MAPL26= 170330    MFPD0A  027610    PASSPT  042100
JSR5B    021156    MAPH1  = 170206    MAPL27= 170334    MFPI0   026344    PDRTAB  035706
JSR6     021046    MAPH10= 170242    MAPL3  = 170214    MFPI0A  026376    PFMES   042344
JSR6A    021072    MAPH11= 170246    MAPL30= 170340    MFPT   = 000007    PIRQ   = 177772
JSR6AD   021232    MAPH12= 170252    MAPL31= 170344    MMHDLR  035564    PIRQVE= 000240
JSR6B    021106    MAPH13= 170256    MAPL32= 170350    MMR0   = 177572    PR0    = 000000
JSR7     021170    MAPH14= 170262    MAPL33= 170354    MMR1   = 177574    PR1    = 000040
JSR7A    021206    MAPH15= 170266    MAPL34= 170360    MMR2   = 177576    PR2    = 000100
JSR7B    021222    MAPH16= 170272    MAPL35= 170364    MMR3   = 172516    PR3    = 000140
KDPAR0= 172360     MAPH17= 170276    MAPL36= 170370    MMVEC  = 000250    PR4    = 000200
KDPAR1= 172362     MAPH2  = 170212    MAPL37= 170374    MOVCI  = 076130    PR5    = 000240
KDPAR2= 172364     MAPH20= 170302    MAPL4  = 170220    MOV1    021404    PR6    = 000300
KDPAR3= 172366     MAPH21= 170306    MAPL5  = 170224    MOV2    021420    PR7    = 000340
KDPAR4= 172370     MAPH22= 170312    MAPL6  = 170230    MOV3    021436    PS     = 177776
KDPAR5= 172372     MAPH23= 170316    MAPL7  = 170234    MRK1    025426    PSW    = 177776
KDPAR6= 172374     MAPH24= 170320    MBDM2A  014244    MRK2    025450    PUSRM  = 030000
KDPAR7= 172376     MAPH25= 170326    MBDM2B  014260    MRK3    025464    PWRDN   042266
KDPDR0= 172320     MAPH26= 170332    MBDM2C  014302    MRK4    025506    PWRUP   042276
KDPDR1= 172322     MAPH27= 170336    MBDM2D  014314    MRK5    025524    PWRVEC= 000024
KDPDR2= 172324     MAPH3  = 170216    MBDM2E  014330    MRK6    025540    PWR2    042340
KDPDR3= 172326     MAPH30= 170342    MBDM2F  014352    MSG     042102    REG1    002240
KDPDR4= 172330     MAPH31= 170346    MBDM4A  014756    MTPD0   027674    REG1A   002310
KDPDR5= 172332     MAPH32= 170352    MBDM4B  015000    MTPI0   026466    REG1E   002252
KDPDR6= 172334     MAPH33= 170356    MBDM4C  015012    NBR     026662    REG2    002364
KDPDR7= 172336     MAPH34= 170362    MBDM4D  015026    NEG00   004774    REG2A   002416
KERSTK= 001100     MAPH35= 170366    MBDM4E  015046    NEG01   005010    REG2B   002444
KIPAR0= 172340     MAPH36= 170372    MDM1A   014054    NEG02   005030    REG2C   002502
KIPAR1= 172342     MAPH37= 170376    MDM1B   014070    NEG03   005044    REG3    002530
KIPAR2= 172344     MAPH4  = 170222    MDM2A   014136    NEG04   005060    REG3A   002600
KIPAR3= 172346     MAPH5  = 170226    MDM2B   014152    NEG1    023120    REG3E   002542
KIPAR4= 172350     MAPH6  = 170232    MDM2C   014160    NEG10   005130    REG4    002654
KIPAR5= 172352     MAPH7  = 170236    MDM2D   014174    NEG11   005144    REG4A   002724
KIPAR6= 172354     MAPL0  = 170200    MDM3A   014432    NEG12   005166    REG4E   002666
KIPAR7= 172356     MAPL00= 170200    MDM3B   014446    NEG13   005202    REG5    003000
KIPDR0= 172300     MAPL01= 170204    MDM3C   014470    NEG14   005216    REG5A   003050
KIPDR1= 172302     MAPL02= 170210    MDM3D   014514    NEG2    023134    REG5E   003012
KIPDR2= 172304     MAPL03= 170214    MDM3E   014546    NEG20   005270    REG6    003124
KIPDR3= 172306     MAPL04= 170220    MDM4A   014632    NEG21   005304    REG6A   003174
KIPDR4= 172310     MAPL05= 170224    MDM4B   014646    NEG22   005336    REG6E   003136
KIPDR5= 172312     MAPL06= 170230    MDM4C   014666    NEG3    023156    REN     040546
KIPDR6= 172314     MAPL07= 170234    MDM5A   015122    NEG30   005714    RESR    035636
KIPDR7= 172316     MAPL1  = 170204    MDM5B   015136    NEG31   005730    REST    025630
KMTSTS  035160     MAPL10= 170240    MDM5C   015160    NEG32   005750    RESTRT  001122
KSP    =%000006    MAPL11= 170244    MDM5D   015202    NEG33   006000    RESVEC= 000010
LF     = 000012    MAPL12= 170250    MDM5E   015234    NEG34   006020    ROL1    024104
LKS    = 177546    MAPL13= 170254    MDM6A   015310    NEG4    023172    ROL2    024120
LKVEC  = 000100    MAPL14= 170260    MDM6B   015324    NEG40   006442    ROL3    024136
LOADRS= 177740     MAPL15= 170264    MDM6C   015346    NEG41   006456    ROL4    024152
MAINT  = 177750    MAPL16= 170270    MDM6D   015372    NEG42   006476    ROL5    024166
MAPH0  = 170202    MAPL17= 170274    MDM6E   015426    NEG5    023212    ROL6    024202
```

SYMBOL TABLE

```
ROL7    024224
ROR1    024272
ROR2    024306
ROR3    024324
ROR4    024340
ROR5    024356
ROR6    024372
ROR7    024406
ROTX    017204
ROTXAD  017340
ROT0A   016236
ROT0B   016252
ROT0C   016274
ROT1A   016346
ROT1B   016362
ROT1C   016406
ROT1D   016422
ROT1E   016452
ROT2A   016530
ROT2B   016544
ROT2C   016574
ROT2D   016610
ROT2E   016644
ROT3A   016716
ROT3B   016732
ROT3C   016760
ROT3D   016774
ROT3E   017022
ROT4    017102
ROT5    017170
ROT6    017244
ROT7    017324
RTS1    021334
R1ERR   002326
R10     =%000000
R11     =%000001
R12     =%000002
R13     =%000003
R14     =%000004
R15     =%000005
R2ERR   002466
R3ERR   002616
R4ERR   002742
R5ERR   003066
R6      =%000006
R6ERR   003212
R7      =%000007
SA      041624
SAVR    035604
SBC1    023716
SBC2    023732
SBC3    023750
SBC4    023764
SBC5    024002
SBC6    024016
SBC7    024036
SB0     017376
SB2     017534
SB4     017674
SB5     017772
SB5A    017764
SB5X    020006
SB5XAD  020010
SB6     020050
SB6X    020064
SB7     020124
SB7X    020140
SB7XAD  020142
SCOPE = 000004
SC3     027420
SC4     027434
SDPAR0= 172260
SDPAR1= 172262
SDPAR2= 172264
SDPAR3= 172266
SDPAR4= 172270
SDPAR5= 172272
SDPAR6= 172274
SDPAR7= 172276
SDPDR0= 172220
SDPDR1= 172222
SDPDR2= 172224
SDPDR3= 172226
SDPDR4= 172230
SDPDR5= 172232
SDPDR6= 172234
SDPDR7= 172236
SETBR   026542
SETCC   026562
SETCD   027416
SETPDR  035106
SETUP   026524
SET2BR  026632
SHL     001654
SHLE    001670
SHR     002000
SHRE    002014
SIPAR0= 172240
SIPAR1= 172242
SIPAR2= 172244
SIPAR3= 172246
SIPAR4= 172250
SIPAR5= 172252
SIPAR6= 172254
SIPAR7= 172256
SIPDR0= 172200
SIPDR1= 172202
SIPDR2= 172204
SIPDR3= 172206
SIPDR4= 172210
SIPDR5= 172212
SIPDR6= 172214
SIPDR7= 172216
SIZEHI= 177762
SIZELO= 177760
SMTSTS  035272
SNMB0A  007214
SNMB1A  007330
SNMB1B  007344
SNMB1C  007366
SNMB2A  007524
SNMB2B  007540
SNMB2C  007560
SNMB2D  007600
SNMB2E  007614
SNMB3A  007772
SNMB3B  010006
SNMB3C  010024
SNMB3D  010040
SNM0A   007150
SNM1A   007262
SNM2A   007434
SNM2B   007450
SNM3A   007674
SNM3B   007710
SNM4A   010114
SNM4B   010130
SNM5A   010206
SNM5B   010222
SNM6A   010302
SNM6B   010316
SNM7A   010374
SNM7B   010410
SOB1    025272
SOB2    025300
SOB3    025314
SOB4    025334
SOPA    007062
SOPB    007102
SOPB0A  004156
SOPB0B  004166
SOPB1A  004320
SOPB1B  004336
SOPB1C  004412
SOPB1D  004432
SOPB2A  004606
SOPB2B  004626
SOPB2C  004706
SOPB2D  004732
SOPB3A  005514
SOPB3B  005540
SOPB3C  005616
SOPB3D  005640
SOPX    007042
SOPXAD  007116
SOPZA   004510
SOP0A   003770
SOP0B   004014
SOP0C   004066
SOP0D   004112
SOP1A   004234
SOP1B   004246
SOP2B   004530
SOP3A   005420
SOP3B   005434
SOP4A   006106
SOP4B   006126
SOP5A   006200
SOP5B   006214
SOP6A   006270
SOP6B   006304
SOP7A   006362
SOP7B   006376
SPSW    042542
SRC.PT  035574
SR0   = 177572
SR1   = 177574
SR2   = 177576
SR3   = 172516
SSP   =%000006
SSP1A   025704
SSP2    025720
STACK = 001100
START   001100
STBOT = 001000
STKLMT= 177774
STK1    035704
SUBT    042544
SUBT1   042546
SUB0    010560
SUB0A   010574
SUB1    023524
SUB2    023540
SUB3    023562
SUB4    023576
SUB5    023614
SUB6    023630
SUB7    023650
SUPSTK= 000700
SVR0    035670
SVR1    035672
SVR2    035674
SVR3    035676
SVR4    035700
SVR5    035702
SWB1    022456
SWB2    022472
SWB3    022510
SWREG   000176
SW0   = 000001
SW00  = 000001
SW01  = 000002
SW02  = 000004
SW03  = 000010
SW04  = 000020
SW05  = 000040
SW06  = 000100
SW07  = 000200
SW08  = 000400
SW09  = 001000
SW1   = 000002
SW10  = 002000
SW11  = 004000
SW12  = 010000
SW13  = 020000
SW14  = 040000
SW15  = 100000
SW2   = 000004
SW3   = 000010
SW4   = 000020
SW5   = 000040
SW6   = 000100
SW7   = 000200
SW8   = 000400
SW9   = 001000
SXT0    025050
SXT1    025064
SXT2    025114
SYSTID= 177764
S1      042550
S2      042552
S3      042554
S4      042556
TBITVE= 000014
TBL1    015732
TBL2    016022
TEST1   022360
TEST2   022374
TEST3   022412
TKVEC = 000060
TO10    042416
TO114   042476
TO14    042432
TO244   042512
TO250   042526
TO30    042446
TO34    042462
TO4     042402
TPB   = 177566
TPS   = 177564
TPVEC = 000064
TRAPVE= 000034
TRTVEC= 000014
TST1    001154
TST10   001630
TST100  007402
TST101  007472
TST102  007636
TST103  007732
TST104  010062
TST105  010150
TST106  010244
TST107  010336
TST11   001704
TST110  010430
```

SYMBOL TABLE

```
TST111  010470
TST112  010530
TST113  010614
TST114  011002
TST115  011102
TST116  011252
TST117  011346
TST12   001754
TST120  011410
TST121  011452
TST122  011514
TST123  011604
TST124  011650
TST125  011732
TST126  012016
TST127  012104
TST13   002030
TST130  012152
TST131  012220
TST132  012266
TST133  012354
TST134  012442
TST135  012554
TST136  012742
TST137  013122
TST14   002064
TST140  013244
TST141  013432
TST142  013556
TST143  013700
TST144  014024
TST145  014110
TST146  014216
TST147  014376
TST15   002122
TST150  014600
TST151  014710
TST152  015070
TST153  015256
TST154  015452
TST155  015644
TST156  015734
TST157  016024
TST16   002160
TST160  016114
TST161  016204
TST162  016310
TST163  016466
TST164  016660
TST165  017036
TST166  017116
TST167  017206
TST17   002216
TST170  017260
TST171  017342
TST172  017420
TST173  017466
TST174  017556
TST175  017624
TST176  017714
TST177  020012
TST2    001264
TST20   002266
TST200  020066
TST201  020144
TST202  020554
TST203  021272
TST204  021356
TST205  021452
TST206  021552
TST207  021652
TST21   002342
TST210  021754
TST211  022106
TST212  022270
TST213  022332
TST214  022426
TST215  022524
TST216  022734
TST217  023066
TST22   002422
TST220  023226
TST221  023426
TST222  023472
TST223  023664
TST224  024052
TST225  024240
TST226  024422
TST227  024612
TST23   002506
TST230  025012
TST231  025130
TST232  025252
TST233  025350
TST234  025554
TST235  025630
TST236  025750
TST237  026260
TST24   002556
TST240  026376
TST241  026514
TST242  026760
TST243  027134
TST244  027214
TST245  027260
TST246  027474
TST247  027610
TST25   002632
TST250  027722
TST251  027760
TST252  030154
TST253  030260
TST254  030354
TST255  030450
TST256  030544
TST257  030644
TST26   002702
TST260  030744
TST261  031044
TST262  031144
TST263  031272
TST264  031420
TST265  031546
TST266  031676
TST267  032022
TST27   002756
TST270  032146
TST271  032272
TST272  032416
TST273  032546
TST274  032674
TST275  033012
TST276  033130
TST277  033246
TST3    001324
TST30   003026
TST300  033364
TST301  033502
TST302  033620
TST303  033736
TST304  034054
TST305  034202
TST306  034330
TST307  034456
TST31   003102
TST310  034602
TST311  035754
TST312  036104
TST313  036230
TST314  036354
TST315  036476
TST316  036620
TST317  036742
TST32   003152
TST320  037064
TST321  037206
TST322  037272
TST323  037356
TST324  037540
TST325  037662
TST326  040004
TST327  040070
TST33   003226
TST330  040154
TST331  040240
TST332  040506
TST333  040634
TST334  040720
TST335  041172
TST336  041334
TST337  041462
TST34   003272
TST340  041704
TST35   003334
TST36   003376
TST37   003440
TST4    001366
TST40   003520
TST41   003600
TST42   003660
TST43   003740
TST44   004034
TST45   004126
TST46   004202
TST47   004262
TST5    001430
TST50   004352
TST51   004446
TST52   004544
TST53   004642
TST54   004746
TST55   005100
TST56   005240
TST57   005360
TST6    001472
TST60   005450
TST61   005554
TST62   005654
TST63   006050
TST64   006142
TST65   006230
TST66   006320
TST67   006412
TST7    001542
TST70   006516
TST71   006634
TST72   006730
TST73   007030
TST74   007120
TST75   007164
TST76   007230
TST77   007276
UDPAR0= 177660
UDPAR1= 177662
UDPAR2= 177664
UDPAR3= 177666
UDPAR4= 177670
UDPAR5= 177672
UDPAR6= 177674
UDPAR7= 177676
UDPDR0= 177620
UDPDR1= 177622
UDPDR2= 177624
UDPDR3= 177626
UDPDR4= 177630
UDPDR5= 177632
UDPDR6= 177634
UDPDR7= 177636
UIPAR0= 177640
UIPAR1= 177642
UIPAR2= 177644
UIPAR3= 177646
UIPAR4= 177650
UIPAR5= 177652
UIPAR6= 177654
UIPAR7= 177656
UIPDR0= 177600
UIPDR1= 177602
UIPDR2= 177604
UIPDR3= 177606
UIPDR4= 177610
UIPDR5= 177612
UIPDR6= 177614
UIPDR7= 177616
UMTSTS  035422
USESTK= 000600
USP    =%000006
USP1    025654
USP2    025750
USP2A   026040
USP3    026070
USP4    026120
USP5    026200
USP6    026230
USRM   = 140000
USTBOT  042402
WAIT    042014
WATE    042324
XBIT1   021504
XBIT2   021520
XBIT3   021536
XOR1    025174
XOR2    025210
XOR3    025236
YBR     026666
YNTAB   042230
$APTHD  000330
$CPUOP  000326
$DEVCT  000310
$ENDAD  042046
$ENV    000320
$ENVM   000321
$EPIRQ  042222
$ERN   = 001003
$ERROR= 000302
$ETABL  000320
$ETEND  000330
$FATAL  000302
$HIBTS  000330
$LPADR  042224
$LPERR  042226
$MAIL   000300
$MBADR  000332
$MSGAD  000314
$MSGLG  000316
```

SYMBOL TABLE

```
$MSGTY  000300          $SWREG  000322          $TMP2   042216          $TSTNM= 000304          $X    = 041472
$PASS   000306          $TESTN  000304          $TMP3   042220          $UNIT   000312          $XX   = 177667
$PASTM  000336          $TMP0   042212          $TN    = 000340         $UNITM  000340          $XXX  = 000666
$SVPC = 000200          $TMP1   042214          $TSTM   000334          $USWR   000324          .$X   = 001100
$SWR  = 000000

. ABS.  042562     000
        000000     001
ERRORS DETECTED:  0

VIRTUAL MEMORY USED:  20364 WORDS  ( 80 PAGES)
DYNAMIC MEMORY:  20034 WORDS  ( 77 PAGES)
ELAPSED TIME:  00:38:35
CKKAAB.BIN,CKKAAB/CR/-SP/NL:TOC=CKKAAB.MLB/ML,CKKAAB.P11
```