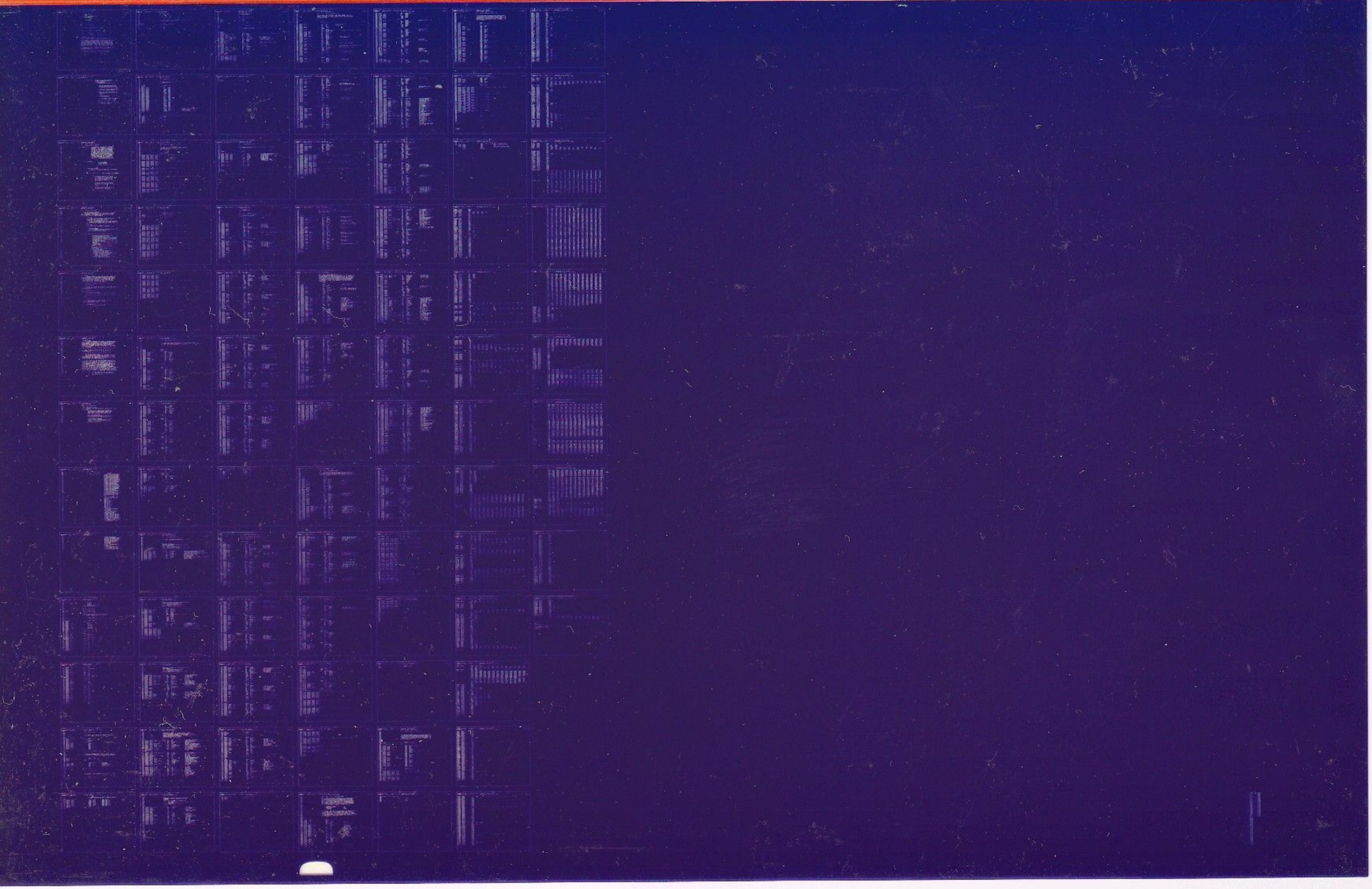
BDV11-AA

BOOTSTRAP DIAGNOSTIC
CVM8AB0

AH-B062B-MC

FICHE 1 OF 1

JAN 1979
digital
MADE IN USA



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                        .ENABL  ABS,AMA
002000                  .=2000
                        .NLIST  CND,MD,MEB,ME
                .TITLE USER DOCUMENTATION
                .SBTTL  IDENTIFICATION



                ; PRODUCT CODE: AC-B061B-MC

                ; PRODUCT NAME: CVM8AB0 BDV11-AA DIAG

                ; MAINTAINER:   DIAGNOSTIC ENGINEERING

                ; AUTHOR:       MARY MCNALLY    18-AUG-77

                ; REVISED:      BILL HEAVEY     NOV,1978

                ;
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                        ;++
                        ; FUNCTIONAL DESCRIPTION:  THE BDV11-AA BOOTSTRAP/TERMINATOR/
                        ;                          DIAGNOSTIC MODULE PROVIDES THE
                        ;                          FOLLOWING FUNCTIONS:
                        ;                               1. ROM RESIDENT HARDCORE DIAGNOSTIC
                        ;                                  TESTS.
                        ;
                        ;                               2. PADS FOR ROM RESIDENT BOOTSTRAP
                        ;                                  ROUTINES FOR THOSE DEVICES WHICH
                        ;                                  ARE SUPPORTED BY THE LSI-11 SYSTEM.
                        ;
                        ;                               3. A READ/WRITE STORAGE REGISTER FOR
                        ;                                  USE BY THE RESIDENT DIAGNOSTIC TESTS.
                        ;
                        ;                               4. TWELVE DIP ROCKER SWITCHES TO SELECT
                        ;                                  TESTING AND BOOTSTRAP OPTIONS AT
                        ;                                  POWER UP.
                        ;
                        ;                               5. AN ARRAY OF FOUR LED'S TO PROVIDE
                        ;                                  STATUS INFORMATION.
                        ;
                        ;                               6. HALT AND REBOOT TOGGLE SWITCHES FOR
                        ;                                  USE IN SYSTEMS WITHOUT A CONSOLE.
                        ;
                        ;                               7. SOCKETS FOR 2K WORDS OF EPROM.
                        ;
                        ;                               8. OPTIONAL REPLACEMENT OF SYSTEM ROM
                        ;                                  BY 8K WORDS OF EPROM.
                        ;
                        ;--
                        ; VERSION: 00
```

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                        .SBTTL  GENERAL PROGRAM INFORMATION

                        ; PROGRAM PURPOSE:  THIS DIAGNOSTIC WILL BE USED TO ESTABLISH
                        ;                   CONFIDENCE THAT THE MODULE IS FUNCTIONING
                        ;                   PROPERLY. IT WILL PROVIDE CHECKSUM VERI-
                        ;                   FICATION OF THE CONTENTS OF THE DIAGNOSTIC
                        ;                   ROMS AND ANY ADDITIONAL ROM OR EPROM.IN
                        ;                   ADDITION, IT WILL VERIFY THAT THE PROPER
                        ;                   DIAGNOSTIC ROMS ARE INSERTED IN THE MODULE
                        ;                   BY COMPARING THE ACTUAL CHECKWORDS IN THE
                        ;                   ROMS TO THOSE SPECIFIED IN THE DIAGNOSTIC
                        ;                   PROGRAM. IT WILL ALSO ACCEPT CHECKWORDS
                        ;                   FROM AN OPERATOR FOR USE IN TESTING ANY
                        ;                   ADDITIONAL ROM/EPROM. THE DIAGNOSTIC WILL
                        ;                   ALSO TEST THE PROGRAMMABLE REGISTERS AND
                        ;                   EXERCISE THE LED'S FOR OPERATOR INSPECTION.
                        ;
                        ; SYSTEM REQUIREMENTS:
                        ;                   HARDWARE:       LSI-11 PROCESSOR
                        ;                                   16K WORDS OF MEMORY
                        ;                                   CONSOLE TERMINAL
                        ;                                   DIAGNOSTIC PROGRAM LOAD DEVICE
                        ;
                        ; RELATED DOCUMENTS AND STANDARDS:
                        ;                   DIAGNOSTIC SUPERVISOR FUNCTIONAL SPEC (176-681-001)
                        ;                   APT/DIAGNOSTIC SUPERVISOR INTERFACE SPEC (176-681-003)
                        ;
                        ; DIAGNOSTIC HIERARCHY PREREQUISITES:   NONE, ALTHOUGH IT IS ASSSUMED THAT
                        ;                                      THE CPU IS FUNCTIONING PROPERLY.
                        ;
                        ; ASSUMPTIONS:          --WHEN RUNNING UNDER APT, ALL ROCKER
                        ;                         SWITCHES ARE IN THE ''ON'' POSITION.
                        ;                         THE EXCEPTION TO THIS OCCURS ONLY
                        ;                         WHEN AN OPERATOR CHANGES THE HARD-
                        ;                         WARE P-TABLE TO CORRESPOND TO THE NEW
                        ;                         SWITCH SETTINGS.
                        ;
                        ;                       --THE ADDRESS JUMPERS ARE CONFIGURED
                        ;                         AND MEMORY CHIPS INSTALLED PROPERLY.
                        ;                         NO TWO CHIPS CAN RESPOND TO THE SAME
                        ;                         ADDRESS.
                        ;
                        ;                       --THE MODULE UNDER TEST RESIDES IN THE
                        ;                         SAME BACKPLANE AS THAT FROM WHICH THE
                        ;                         LINE TIME CLOCK IS GENERATED.
                        ;
                        ;                       --THE CPU IS WORKING  PROPERLY.
                        ;
```

```
                        .SBTTL  OPERATING INSTRUCTIONS

                        ;1. LOADING AND STARTING PROCEDURES
                        ;       IN SYSTEMS OTHER THAN APT, BOTH THE DIAGNOSTIC PROGRAM
                        ;AND THE DIAGNOSTIC SUPERVISOR WILL BE LOADED BY EITHER PAPER
                        ;TAPE OR XXDP MEDIA. THE COMBINED FILE WILL BE CALLED CVM8AB,
                        ;AND IS LOADED BY THE FOLLOWING COMMANDS:
                        ;
                        ;       I. PAPER TAPE
                        ;               TO LOAD, PLACE AN ABSOLUTE LOADER IN THE PAPER
                        ;          TAPE READER, AND TYPE '177550L'. THEN PLACE THE
                        ;          CVM8AB TAPE IN THE READER AND TYPE 'P'.
                        ;               TO CALL THE SUPERVISOR, TYPE '200G'. THE SUPERVISOR
                        ;          WILL RESPOND WITH A FEW QUESTIONS AND A PROMPT CHARACTER.
                        ;          SEE THE SUPERVISOR COMMANDS BELOW FOR FURTHER INSTRUCTIONS.
                        ;
                        ;       II. XXDP MEDIA
                        ;               TO LOAD, TYPE 'L CVM8AB'. TO CALL THE
                        ;          SUPERVISOR, TYPE 'S 200' WHEN THE PROGRAM IS LOADED.
                        ;
                        ;       III. SUPERVISOR COMMANDS
                        ;               ONCE THE SUPERVISOR HAS BEEN INVOKED AT LOCATION 200,
                        ;          THE FOLLOWING COMMANDS SHOULD BE USED SELECTIVELY TO
                        ;          CONTROL THE RUNNING OF THE DIAGNOSTIC:
                        ;2. TO START
                        ;
                        ;     START/TEST:<TESTNOS>/PASS:<PASSCNT>/UNIT:<DEVN>/FLAG:<CF>:<CF>
                        ;WHERE:
                        ;     TEST        ::-(DEFINES WHICH TESTS TO EXECUTE, IF NO
                        ;                     SPECIFICATION EXECUTE ALL TESTS)
                        ;     PASS        ::=(INDICATES HOW MANY PASSES TO RUN, IF NO SPEC-
                        ;                     IFICATION RUN UNTIL DIAGNOSTIC ESCAPE SEQUENCE)
                        ;     UNIT        ::-(SPECIFIES WHICH UNIT ENTRIES TO GET FROM THE
                        ;                     CONFIGURATION FILE, IF NO SPECIFICATION USE ALL
                        ;                     APPLICABLE UNIT ENTRIES)
                        ;     FLAG        :: (SPECIFIES THE ERROR CONTROL/REPORT FLAG OPTIONS
                        ;                     TO BE USED)
                        ;     <TESTNOS>   ::-(LIST FOR UP TO 16 TESTS TO BE EXECUTED IN AN
                        ;                     ASCENDING ORDER.
                        ;     <PASSCNT>   ::-(NUMBER OF PROGRAM PASSES TO EXECUTE)
                        ;
                        ;     <DEVN>      :: (UNIQUE,DEC STANDARD, DEVICE SPECIFIER AND
                        ;                     UNIT NUMBER)
                        ;     <CF>        ::-(ANY OF THE FOLLOWING CONTROL FLAGS:
                        ;                      HOE-HALT ON ERROR
                        ;                      LOE-LOOP ON ERROR AND ATTEMPT REPORT
                        ;                      IER-INHIBIT ALL ERROR REPORTS
                        ;                      IBE-INHIBIT BASIC AND EXTENDED ERROR REPORTS
                        ;                      IEE-INHIBIT EXTENDED ERROR REPORTS
                        ;                      PRI-DIRECT ALL ERROR, PASS, AND STATISTICAL
                        ;                          REPORTS TO THE LINE PRINTER.
                        ;                      BOE-AUDIO ERROR INDICATION
                        ;                      UAM-UNATTENDED MODE, NO OPERATOR INTERVENTION
                        ;                      PN'-PRINT NUMBER OF TEST BEING EXECUTED.)
```

```
                        ;3. TO RESTART
                        ;       THE RESTART COMMAND IS SIMILAR TO THE START COMMAND EXCEPT
                        ;THAT ALL PARAMETERS ARE ASSUMED TO BE ALREADY DEFINED, AND NO
                        ;OPERATOR DIALOGUE IS PERFORMED PRIOR TO RUNNING THE DIAGNOSTIC.
                        ;IF THE OPERATOR WISHES TO ALTER THE TYPE OF ADDITIONAL MEMORY
                        ;TO TEST, OR CHANGE THE ADDRESSES, LOCATION 'PASS'' MUST BE
                        ;CLEARED MANUALLY PRIOR TO RESTARTING, SINCE THIS INFORMATION
                        ;IS SET UP ON THE FIRST PASS OF THE DIAGNOSTIC.
                        ;
                        ;       RESTART/TEST:<TESTNOS>/PASS:<PASSCNT>/FLAG:<CF>:<CF>...
                        ;
                        ;4. TO RETURN TO PROGRAM
                        ;
                        ;       TO RESUME EXECUTION OF THE DIAGNOSTIC AT THE FIRST INSTRUCTION
                        ;FOLLOWING THE CURRENT SUPERVISOR CALL, AT WHICH TIME NEW FLAGS
                        ;MAY BE ASSIGNED.
                        ;
                        ;       CONTINUE/FLAG:<CF>:<CF>:...
                        ;
                        ;5. TO LOAD AND START THE DIAGNOSTIC
                        ;       TO LOAD AND START THE DIAGNOSTIC USING DEFAULT PARAMETERS
                        ;
                        ;     RUN<FILESPEC>/TEST:<TESTNOS>/PASS:<PASSCNT>/UNIT:<DEVN>/FLAG:<CF>...
                        ;
                        ;6. TO RETURN TO SUPERVISOR
                        ;
                        ;       EXIT
                        ;
                        ;NOTE:  TEST NUMBERS AND UNIT NUMBERS MAY BE SPECIFIED
                        ;       AS SINGLE NUMBERS, RANGES OF NUMBERS (I.E. 1-6 ),
                        ;       OR COMBINATIONS OF BOTH.
                        ;
                        ; SPECIAL ENVIRONMENTS: APT
                        ;       TEST 7, THE TEST OF ALL RESIDENT MEMORY, WILL NOT RUN
                        ;UNDER APT, AS IT REQUIRES USER INTERVENTION.
```

```
                        ; PROGRAM OPTIONS:
                        ;       THE HARDWARE PARAMETERS ARE STORED IN A PARAMETER TABLE WITH
                        ;DEFAULT VALUES. THE OPERATOR WILL HAVE THE OPTION OF CHANGING
                        ;THESE PARAMETERS BY RESPONDING TO THE APPROPRIATE QUESTIONS
                        ;GENERATED BY THE DIAGNOSTIC SUPERVISOR. THESE PARAMETERS
                        ;INCLUDE THE UNIT NUMBER,INTERRUPT VECTOR,PRIORITY LEVEL, AND
                        ;ROCKER SWITCH SETTINGS. THE DEFAULT VALUES WILL BE TYPED ALONG
                        ;WITH THE QUESTIONS.
                        ;       THE ROCKER SWITCH SETTINGS ARE EXAMINED IN THE FOLLOWING
                        ;ORDER:
                        ;       B4  B3  B2  B1  A8  A7  A6  A5  A4  A3  A2  A1
                        ;FOR EXAMPLE, IF SWITCHES A1,A2,A6, AND B1 WERE ON, THE SWITCH
                        ;SETTING WOULD BE:
                        ;       B4  B3  B2  B1  A8  A7  A6  A5  A4  A3  A2  A1
                        ;                   1               1               1   1
                        ;WHICH HAS AN OCTAL VALUE OF 0443.
                        ;       THE SOFTWARE P-TABLE CONTAINS THE CHECKWORDS FOR THE 2K
                        ;OF DIAGNOSTIC ROM WHICH IS RESIDENT ON THE BDV11A. TO CHANGE
                        ;THESE CHECKWORDS, THE OPERATOR MUST RESPOND WITH A YES TO THE
                        ;SUPERVISOR'S QUESTION ''CHANGE SW (Y/N)?''. THE DEFAULT VALUES WILL
                        ;THEN BE PRINTED AS THE QUESTIONS ARE ASKED.

                        ;       TEST 7 CHECKS ALL THE ADDITIONAL MEMORY THAT IT IS
                        ;INSTRUCTED TO TEST. THIS TEST IS SET UP BY THE OPERATOR ON THE
                        ;FIRST PASS OF THE DIAGNOSTIC. THE DIAGNOSTIC WILL ASK IF THERE
                        ;IS ANY ADDITIONAL MEMORY TO TEST, AND IF SO WILL ASK WHICH
                        ;TYPE OF MEMORY IT IS. (THE OPERATOR CAN ANSWER THESE QUESTIONS
                        ;WITH LOGICAL Y/N ANSWERS.) IF ANY ADDITIONAL MEMORY IS TO BE
                        ;TESTED, THE OPERATOR MUST SUPPLY THE CHECKWORDS FOR THOSE
                        ;ROMS/EPROMS. IN THE CASE OF SYSTEM ROM/EPROM, THE OPERATOR WILL
                        ;ALSO HAVE TO INDICATE HOW MANY CHECKWORDS WILL BE INPUT (IN DECIMAL).
                        ;NOTE THAT ONCE THIS DATA IS SET UP, THIS MEMORY WILL ALWAYS BE
                        ;TESTED, EVEN IF THE DIAGNOSTIC IS RESTARTED, UNLESS THE LOCATION
                        ;''PASS'' IS CLEARED (SEE SEC.3 OF LOADING AND STARTING PROCEDURES).
                        ;
                        ; EXECUTION TIMES:  A SINGLE ERROR-FREE PASS WILL REQUIRE
                        ;                   LESS THAN 1 SEC. TO RUN UNDER APT. WHEN RUN
                        ;                   IN STAND-ALONE MODE, IT WILL REQUIRE LESS
                        ;                   THAN 3 SECS. TO RUN.
```

```
                        .SBTTL  ERROR INFORMATION

                        ; ERROR REPORTING PROCEDURES:
                        ;       IN GENERAL, ALL ERROR REPORTS WILL CONTAIN THE FOLLOWING
                        ;INFORMATION:
                        ;       1. A HEADER OF TEST IDENTIFICATION INFORMATION.
                        ;          THIS INCLUDES THE PROGRAM NAME, TYPE OF ERROR,
                        ;          ERROR NUMBER, TEST AND SUBTEST NUMBERS, UNIT
                        ;          NUMBER, AND AN OPTIONAL ADDITIONAL MESSAGE.
                        ;
                        ;       2. BASIC ERROR INFORMATION.
                        ;          THIS IS A SPECIFIC STATEMENT OF WHAT THE ERROR
                        ;          IS AND WHICH REGISTER OR ROM WAS INVOLVED.
                        ;
                        ;       3. EXTENDED ERROR INFORMATION.
                        ;          THIS IS OPTIONAL INFORMATION WHICH IS USED
                        ;          PRIMARILY TO GIVE THE EXPECTED AND ACTUAL
                        ;          CONTENTS OF THE APPROPRIATE DEVICE REGISTER
                        ;          DURING REGISTER TESTS.
```

```
                                .SBTTL  SUBTEST SUMMARIES
                                ;
                                ;       TEST NO.        SUBTEST NO.             PURPOSE
                                ;          1                1          TO VERIFY THAT THE READ/WRITE
                                ;                                      REGISTER CAN HOLD ALL ZEROES.
                                ;                           2          TO VERIFY THAT THE READ/WRITE
                                ;                                      REGISTER CAN HOLD ALL ONES.
                                ;                           3          TO VERIFY THAT THE READ/WRITE
                                ;                                      REGISTER CAN HOLD AN ALTER-
                                ;                                      NATING 1'S AND 0'S BIT PATTERN.
                                ;                           4          TO VERIFY THAT THE READ/WRITE
                                ;                                      REGISTER IS BYTE ADDRESSABLE.
                                ;                           5          TO VERIFY THAT THE READ/WRITE
                                ;                                      REGISTER CAN SWAP BYTES.
                                ;                           6          TO VERIFY THAT THE READ/WRITE
                                ;                                      REGISTER CAN HOLD AN ALTER-
                                ;                                      NATING 0' AND 1'S BIT PATTERN.
                                ;                           7          TO VERIFY THAT THE READ/WRITE
                                ;                                      REGISTER IS BYTE ADDRESSABLE.
                                ;                           8          TO VERIFY THAT THE READ/WRITE
                                ;                                      REGISTER CAN SWAP BYTES.
                                ;                           9          TO VERIFY THAT THE READ/WRITE
                                ;                                      REGISTER CAN ROTATE A SET
                                ;                                      BIT WITHOUT PICKING UP ANY BITS.
                                ;                           10         TO VERIFY THAT THE READ/WRITE
                                ;                                      REGISTER CAN ROTATE A CLEAR
                                ;                                      BIT WITHOUT PICKING UP ANY
                                ;                                      BITS.
                                ;          2                1          TEST 2 IS THE SAME AS TEST 1
                                ;                                      EXCEPT THAT THE PAGE CONTROL
                                ;                                      REGISTER IS THE REGISTER
                                ;                                      UNDER TEST.
                                ;                           2          SAME AS TEST 1.
                                ;                           3          SAME AS TEST 1.
                                ;                           4          SAME AS TEST 1.
                                ;                           5          SAME AS TEST 1.
                                ;                           6          SAME AS TEST 1.
                                ;                           7          SAME AS TEST 1.
                                ;                           8          SAME AS TEST 1.
                                ;                           9          SAME AS TEST 1.
                                ;                           10         SAME AS TEST 1.
                                ;          3                1          TO VERIFY THAT THE BEVENT
                                ;                                      CLAMP DISABLE ALLOWS INTER-
                                ;                                      RUPTS WHEN OFF.
                                ;                           2          TO VERIFY THAT THE BEVENT
                                ;                                      CLAMP DISABLE INHIBITS
                                ;                                      INTERRUPTS WHEN ON.
                                ;          4                1          TO VERIFY THAT THE LOW BYTE
                                ;                                      DIAGNOSTIC ROM HAS GOOD DATA.
                                ;                           2          TO VERIFY THAT THE HIGH BYTE
                                ;                                      DIAGNOSTIC ROM HAS GOOD DATA.
                                ;                           3          TO INSURE THAT THE DIAGNOSTIC
                                ;                           4          ROMS HAVE NOT BEEN INTERCHANGED.
                                ;          5                1          TO DETERMINE IF THERE IS ANY
                                ;                                      ADDITIONAL MEMORY TO TEST.
                                ;                                      THIS INFORMATION IS OBTAINED
```

```
                    ;                                   THROUGH USER DIALOGUE.
                    ;                   2               TO TEST THE EXPANDED DIAGNOSTIC
                    ;                                   ROM.FIRST THE REQUIRED CHECK-
                    ;                                   WORDS MUST BE INPUT,AND THE
                    ;                                   STARTING LOCATION IN MEMORY.
                    ;                                   CHECKSUMS AND CHECKWORD
                    ;                                   VERIFICATION CONFIRMS GOOD
                    ;                                   DATA IN ROMS.
                    ;                   3               TO TEST THE EPROM IN THE
                    ;                                   SOCKETS. TEST PROCEDURE IS AS
                    ;                                   IN SUBTEST 2.
                    ;                   4               TO TEST SYSTEM ROM. SAME
                    ;                                   TEST PROCEDURE AS IN SUBTEST 2.
                    ;                   5               TO TEST SYSTEM EPROM. SAME
                    ;                                   TEST PROCEDURE AS IN SUBTEST 2.
```

```
                                        SVC
                                        SVCINS=0
                                        SVCGBL=0
                                        SVCTAG=0
                                .TITLE PROGRAM HEADER AND TABLES
                                .SBTTL  IDENTIFICATION


                                .SBTTL  PROGRAM HEADER

                                        BGNMOD  MDHEDR
                                MDHEDR::

                                ;++
                                ; THE PROGRAM HEADER IS THE INTERFACE BETWEEN
                                ; THE DIAGNOSTIC PROGRAM AND THE SUPERVISOR.
                                ;--

                                        POINTER BGNSW,BGNSFT


                                        HEADER  CVM8AB,B,0,0,0,5
                                L$NAME::
                                        .ASCII /C/
                                        .ASCII /V/
                                        .ASCII /M/
                                        .ASCII /8/
                                        .ASCII /A/
                                        .ASCII /B/
                                        .BYTE   0
                                        .BYTE   0
                                L$REV::
                                        .ASCII  /B/
                                L$DEPO::
                                        .ASCII  /0/
                                L$UNIT::
                                        .WORD   0
                                L$TIML::
                                        .WORD   5
                                L$HPCP::
                                        .WORD   L$HARD
                                L$SPCP::
                                        .WORD   L$SOFT
                                L$HPTP::
                                        .WORD   L$HW
                                L$SPTP::
                                        .WORD   L$SW
                                L$LADP::
                                        .WORD   L$LAST
                                L$STA::
                                        .WORD   0
                                L$CO::
                                        .WORD   0
                                L$EFLG::
                                        .WORD   0
                                L$APT::
```

```
414  002036  000000                  .WORD   0
415  002040                  L$DTP::
416  002040  002112                  .WORD   L$DISPATCH
417  002042                  L$EXP1::
418  002042  000000                  .WORD   0
419  002044                  L$EXP2::
420  002044  000000                  .WORD   0
421  002046                  L$EXP3::
422  002046  000000                  .WORD   0
423  002050                  L$MREV::
424  002050      002                 .BYTE   C$REVISION
425  002051      002                 .BYTE   C$EDIT
426  002052                  L$TIM1::
427  002052  000000                  .WORD   0
428  002054                  .$TIMU::
429  002054  000000                  .WORD   0
430  002056                  L$EF::
431  002056  000000                  .WORD   0
432  002060  000000                  .WORD   0
433  002062                  .$SPC::
434  002062  000000                  .WORD   0
435  002064                  L$DEVP::
436  002064  003036                  .WORD   L$DVTYP
437  002066                  L$REPP::
438  002066  000000                  .WORD   0
439  002070                  L$DRCT::
440  002070  002506                  .WORD   L$DR
441  002072                  L$DRS::
442  002072  002512                  .WORD   L$DRST
443  002074                  L$AUT::
444  002074  000000                  .WORD   0
445  002076                  L$DUT::
446  002076  000000                  .WORD   0
447  002100                  L$TSTID::
448  002100  000000                  .WORD   0
449  002102                  L$DESC::
450  002102  000000                  .WORD   0
451  002104                  .$ICP::
452  002104  005034                  .WORD   L$INIT
453  002106                  .$CCP::
454  002106  005200                  .WORD   L$CLEAN
455  002110                          ENDMOD
456
```

```
                                .SBTTL  DISPATCH TABLE

                                ;++
                                ; THE DISPATCH TABLE CONTAINS THE STARTING ADDRESS OF EACH TEST.
                                ; IT IS USED BY THE SUPERVISOR TO DISPATCH TO EACH TEST.
                                ;--

002110                                  BGNMOD  DSPCODE
002110                          DSPCODE::
002110                                  DISPATCH 7
002110  000007                         .WORD   7
002112                          L$DISPATCH::
002112  005260                         .WORD   T1
002114  006100                         .WORD   T2
002116  006730                         .WORD   T3
002120  007462                         .WORD   T4
002122  007622                         .WORD   T5
002124  010376                         .WORD   T6
002126  011526                         .WORD   T7
002130                                  ENDMOD

                                .SBTTL  DEFAULT HARDWARE P-TABLE

                                ;++
                                ; THE DEFAULT HARDWARE P-TABLE CONTAINS DEFAULT VALUES OF
                                ; THE TEST-DEVICE PARAMETERS.  THE STRUCTURE OF THIS TABLE
                                ; IS IDENTICAL TO THE STRUCTURE OF THE RUN-TIME P-TABLE.
                                ;--

002130                                  BGNHW   DFPTBL
002130  000004                         .WORD   L10000-L$HW/2
002132                          L$HW::
002132                          DFPTBL::

                                        ;DEFAULT VALUES FOR UP TO SIX UNITS
002132  000000                         .WORD   0               ;UNIT NUMBER 0
002134  000100                         .WORD   100             ;INTERRUPT VECTOR
002136  000007                         .WORD   7               ;PRIORITY LEVEL
002140  007777                         .WORD   7777            ;ROCKER SWITCH SETTINGS

002142                                  ENDHW
002142                          L10000:

                                .SBTTL  SOFTWARE P-TABLE

                                ;++
                                ; THE SOFTWARE P-TABLE CONTAINS THE VALUES OF THE PROGRAM
                                ; PARAMETERS THAT CAN BE CHANGED BY THE OPERATOR.
                                ;--

002142                                  BGNSW   SFPTBL
002142  000010                         .WORD   L10001-L$SW/2
002144                          L$SW::
002144                          SFPTBL::
```

```
                                        ;THE SOFTWARE P-TABLE IS USED TO STORE THE CHECKWORDS
                                        ;FOR THE DIAGNOSTIC ROM WHICH IS TESTED IN TEST 6.

002144  017042                         .WORD   17042           ;ROMA: PAGE 0,1
002146  020656                         .WORD   20656           ;ROMB: PAGE 2,3
002150  065162                         .WORD   65162           ;ROMC: PAGE 4,5
002152  161744                         .WORD   161744          ;ROMD: PAGE 6,7
002154  124453                         .WORD   124453          ;ROME: PAGE 10,11
002156  113667                         .WORD   113667          ;ROMF: PAGE 12,13
002160  056040                         .WORD   56040           ;ROMG: PAGE 14,15
002162  044734                         .WORD   44734           ;ROMH: PAGE 16,17
002164                                 ENDSW
002164                          L10001:
```

```
                                .TITLE GLOBAL AREAS
                                .SBTTL  IDENTIFICATION


                                .SBTTL  GLOBAL EQUATES SECTION

                                ;++
                                ; THE GLOBAL EQUATES SECTION CONTAINS PROGRAM EQUATES THAT
                                ; ARE USED IN MORE THAN ONE TEST.
                                ;--

002164                                  BGNMOD  GLBEQAT
002164                          GLBEQAT::
002164                                  EQUALS

        177520                  PCR=177520
        177524                  LSREG=177524
002164                                  ENDMOD
```

```
                        .SBTTL  GLOBAL DATA SECTION

                        ;++
                        ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
                        ; IN MORE THAN ONE TEST.
                        ;--

002164                          BGNMOD  GLBDAT
002164                  GLBDAT::
002164  000000                  BCF:    .WORD   0
002166  000000                  REAL:   .WORD   0
002170  000000                  LOPAG:  .WORD   0
002172  000000                  COUNTR: .WORD   0
002174  000001                  ANSR:   .WORD   1
002176  000000                  RFLAG:  .WORD   0
002200  000000                  EXPSUM: .WORD   0
002202  000000                  ACTSUM: .WORD   0
002204  000000                  PASS:   .WORD   0
002206  000000                  PASCT:  .WORD   0
002210  000000                  ULIMIT: .WORD   0
002212  000000                  PAGE:   .WORD   0
002214  000100                  VECT:   .WORD   100
002216  000000                  SWSET:  .WORD   0
002220  000000                  STORE:  .WORD   0
002222  000000                  WORDCT: .WORD   0
002224  000000                  PRIOR:  .WORD   0
002226  000000                  CKWD:   .WORD   0
002230  000000                  RESPND: .WORD   0
002232  000001                  RSET:   .WORD   1
002234  000000                  LORANG: .WORD   0
002236  000000                  HIRANG: .WORD   0
002240  000000                  BYTLOC: .WORD   0
002242  000000                  ERRFLG: .WORD   0
002244  000010                  EXPDIA: .BLKW   10              ;EXPANDED DIAG. ROM CHECKWORDS
002264  000010                  EPROM:  .BLKW   10              ;EPROM CHECKWORDS
002304  000100                  SYSROM: .BLKW   100             ;SYSTEM ROM/EPROM CHECKWORDS
002504                          ENDMOD


                        ; STORAGE FOR DEVICE REGISTERS
                        ;
002504                          DEVREG  4,177777,DEVDAT,REGMSK
002504  000001                  .WORD   1
002506                  L$DR::
002506                  REGMSK::
002506  177777                  .WORD   177777
002510  000004                  .WORD   4
002512                  L$DRST::
002512                  DEVDAT::
002512  000004                  .BLKW   4
```

```
                                        .SBTTL  GLOBAL TEXT SECTION

                                        ;++
                                        ; THE GLOBAL TEXT SECTION CONTAINS FORMAT STATEMENTS,
                                        ; MESSAGES, AND ASCII INFORMATION THAT ARE USED IN
                                        ; MORE THAN ONE TEST.
                                        ;--


                                        ;GLOBAL MESSAGES

002522  042522  042101  053457  RWR:    .ASCIZ  'READ/WRITE REGISTER    ADDRESS: 177522''
002530  044522  042524  051040
002536  043505  051511  042524
002544  004522  042101  051104
002552  051505  035123  030440
002560  033467  031065  000062

002566  040520  042507  041440  PACR:   .ASCIZ  /PAGE CONTROL REGISTER  ADDRESS: 177520/
002574  047117  051124  046117
002602  051040  043505  051511
002610  042524  004522  042101
002616  051104  051505  035123
002624  030440  033467  031065
002632  000060

002634  044103  041505  051513  CKERR:  .ASCIZ  /CHECKSUM ERROR/
002642  046525  042440  051122
002650  051117     000

002653     111  041516  051117  CWDERR: .ASCIZ  /INCORRECT CHECKWORD/
002660  042522  052103  041440
002666  042510  045503  047527
002674  042122     000

002677     105  051122  051117  LOBYT:  .ASCIZ  /ERROR OCCURRED IN A LOW BYTE PAGE/
002704  047440  041503  051125
002712  042522  020104  047111
002720  040440  046040  053517
002726  041040  052131  020105
002734  040520  042507     000

002741     105  051122  051117  HIBYT:  .ASCIZ  /ERROR OCCURRED IN A HIGH BYTE PAGE/
002746  047440  041503  051125
002754  042522  020104  047111
002762  040440  044040  043511
002770  020110  054502  042524
002776  050040  043501  000105

003004  052123  051101  020124  LOADR:  .ASCIZ  /START OF MEMORY RANGE (K)/
003012  043117  046440  046505
003020  051117  020131  040522
003026  043516  020105  045450
003034  000051

                                        .EVEN
```

```
                                        ;
                                        ; NAMES OF DEVICES SUPPORTED BY PROGRAM
                                        ;
                                                DEVTYP  <BDV11AA>
003036                                  L$DVTYP::
003036  042102  030526  040461                 .ASCIZ  /BDV11AA/
003044  000101
                                                .EVEN


                                        ;
                                        ; FORMAT STATEMENTS USED IN PRINT CALLS
                                        ;

003046  040445  042522  044507  ZERR:    .ASCIZ  /%AREGISTER CANNOT HOLD ALL ZEROES%N/
003054  052123  051105  041440
003062  047101  047516  020124
003070  047510  042114  040440
003076  046114  055040  051105
003104  042517  022523  000116

003112  040445  042522  044507  ONERR:   .ASCIZ  /%AREGISTER CANNOT HOLD ALL ONES%N/
003120  052123  051105  041440
003126  047101  047516  020124
003134  047510  042114  040440
003142  046114  047440  042516
003150  022523  000116

003154  040445  042522  044507  BDDAT:   .ASCIZ  /%AREGISTER CANNOT HOLD GOOD DATA%N/
003162  052123  051105  041440
003170  047101  047516  020124
003176  047510  042114  043440
003204  047517  020104  040504
003212  040524  047045     000

003217     045  051101  043505  BYTINS:  .ASCIZ  /%AREGISTER IS NOT BYTE ADDRESSABLE%N/
003224  051511  042524  020122
003232  051511  047040  052117
003240  041040  052131  020105
003246  042101  051104  051505
003254  040523  046102  022505
003262  000116

003264  040445  042522  044507  ROT1:    .ASCIZ  /%AREGISTER PICKED UP AN EXTRA SET BIT%N/
003272  052123  051105  050040
003300  041511  042513  020104
003306  050125  040440  020116
003314  054105  051124  020101
003322  042523  020124  044502
003330  022524  000116

003334  040445  042522  044507  ROT0:    .ASCIZ  /%AREGISTER PICKED UP AN EXTRA CLEAR BIT%N/
003342  052123  051105  050040
```

```
   709  003350  041511  042513  020104
   710  003356  050125  040440  020116
   711  003364  054105  051124  020101
   712  003372  046103  040505  020122
   713  003400  044502  022524  000116
   714
   715  003406  040445  047125  041101  DIAGER: .ASCIZ  /%AUNABLE TO LOCATE CORRECT MEMORY PAGE%N/
   716  003414  042514  052040  020117
   717  003422  047514  040503  042524
   718  003430  041440  051117  042522
   719  003436  052103  046440  046505
   720  003444  051117  020131  040520
   721  003452  042507  047045     000
   722
   723  003457     045  046501  046505  VIRMSG: .ASCIZ  /%AMEMORY RANGE: %D2%A - %D2%AK%N/
   724  003464  051117  020131  040522
   725  003472  043516  035105  022440
   726  003500  031104  040445  026440
   727  003506  022440  031104  040445
   728  003514  022513  000116
   729
   730  003520  040445  054105  042520  REGDT:  .ASCIZ  /%AEXPECTED: %O6%S5%ARECEIVED: %O6%N/
   731  003526  052103  042105  020072
   732  003534  047445  022466  032523
   733  003542  040445  042522  042503
   734  003550  053111  042105  020072
   735  003556  047445  022466  000116
   736
   737                                  .EVEN
```

```
                                        .SBTTL  GLOBAL ERROR REPORT SECTION

                                        ;++
                                        ; THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB AND PRINTX CALLS
                                        ; THAT ARE USED IN MORE THAN ONE TEST.  IT ALSO INCLUDES THE ASCII MESSAGES
                                        ; THAT ARE USED BY THE PRINTB AND PRINTX CALLS.
                                        ;--



003564                                  BGNMSG  RERR1
003564                                  RERR1::
003564                                  PRINTB  #ZERR
003564  012746  003046                          MOV     #ZERR,-(SP)
003570  012746  000001                          MOV     #1,-(SP)
003574  010600                          MOV     SP,R0
003576  104014                          EMT     C$PNTB
003600  062706  000004                          ADD     #4,SP
003604                                  PRINTX  #REGDT,R1,R2
003604  010246                          MOV     R2,-(SP)
003606  010146                          MOV     R1,-(SP)
003610  012746  003520                          MOV     #REGDT,-(SP)
003614  012746  000003                          MOV     #3,-(SP)
003620  010600                          MOV     SP,R0
003622  104015                          EMT     C$PNTX
003624  062706  000010                          ADD     #10,SP
003630                                  ENDMSG
003630                                  L10002:
003630  104023                          EMT     C$MSG

003632                                  BGNMSG  RERR2
003632                                  RERR2::
003632                                  PRINTB  #ONERR
003632  012746  003112                          MOV     #ONERR,-(SP)
003636  012746  000001                          MOV     #1,-(SP)
003642  010600                          MOV     SP,R0
003644  104014                          EMT     C$PNTB
003646  062706  000004                          ADD     #4,SP
003652                                  PRINTX  #REGDT,R1,R2
003652  010246                          MOV     R2,-(SP)
003654  010146                          MOV     R1,-(SP)
003656  012746  003520                          MOV     #REGDT,-(SP)
003662  012746  000003                          MOV     #3,-(SP)
003666  010600                          MOV     SP,R0
003670  104015                          EMT     C$PNTX
003672  062706  000010                          ADD     #10,SP
003676                                  ENDMSG
003676                                  L10003:
003676  104023                          EMT     C$MSG

003700                                  BGNMSG  RERR3
003700                                  RERR3::
003700                                  PRINTB  #RDDAT
003700  012746  003154                          MOV     #RDDAT,-(SP)
003704  012746  000001                          MOV     #1,-(SP)
003710  010600                          MOV     SP,R0
```

```
794  003712  104014                          EMT     C$PNTB
795  003714  062706  000004                  ADD     #4,SP
796  003720                          PRINTX  #REGDT,R1,R2
797  003720  010246                          MOV     R2,-(SP)
798  003722  010146                          MOV     R1,-(SP)
799  003724  012746  003520                  MOV     #REGDT,-(SP)
800  003730  012746  000003                  MOV     #3,-(SP)
801  003734  010600                          MOV     SP,R0
802  003736  104015                          EMT     C$PNTX
803  003740  062706  000010                  ADD     #10,SP
804  003744                          ENDMSG
805  003744                          L10004:
806  003744  104023                          EMT     C$MSG
807
808  003746                          BGNMSG  RERR4
809  003746                          RERR4::
810  003746                          PRINTB  #BYTINS
811  003746  012746  003217                  MOV     #BYTINS,-(SP)
812  003752  012746  000001                  MOV     #1,-(SP)
813  003756  010600                          MOV     SP,R0
814  003760  104014                          EMT     C$PNTB
815  003762  062706  000004                  ADD     #4,SP
816  003766                          PRINTX  #REGDT,R1,R2
817  003766  010246                          MOV     R2,-(SP)
818  003770  010146                          MOV     R1,-(SP)
819  003772  012746  003520                  MOV     #REGDT,-(SP)
820  003776  012746  000003                  MOV     #3,-(SP)
821  004002  010600                          MOV     SP,R0
822  004004  104015                          EMT     C$PNTX
823  004006  062706  000010                  ADD     #10,SP
824  004012                          ENDMSG
825  004012                          L10005:
826  004012  104023                          EMT     C$MSG
827
828  004014                          BGNMSG  RERR5
829  004014                          RERR5::
830  004014                          PRINTB  #ROT1
831  004014  012746  003264                  MOV     #ROT1,-(SP)
832  004020  012746  000001                  MOV     #1,-(SP)
833  004024  010600                          MOV     SP,R0
834  004026  104014                          EMT     C$PNTB
835  004030  062706  000004                  ADD     #4,SP
836  004034                          ENDMSG
837  004034                          L10006:
838  004034  104023                          EMT     C$MSG
839
840  004036                          BGNMSG  RERR6
841  004036                          RERR6::
842  004036                          PRINTB  #ROT0
843  004036  012746  003334                  MOV     #ROT0,-(SP)
844  004042  012746  000001                  MOV     #1,-(SP)
845  004046  010600                          MOV     SP,R0
846  004050  104014                          EMT     C$PNTB
847  004052  062706  000004                  ADD     #4,SP
848  004056                          ENDMSG
849  004056                          L10007:
```

```
   850  004056  104023                    EMT     C$MSG
   851
   852  004060                    BGNMSG  PAGERR
   853  004060                    PAGERR::
   854  004060                    PRINTB  #DIAGER
   855  004060  012746  003406            MOV     #DIAGER,-(SP)
   856  004064  012746  000001            MOV     #1,-(SP)
   857  004070  010600                    MOV     SP,R0
   858  004072  104014                    EMT     C$PNTB
   859  004074  062706  000004            ADD     #4,SP
   860  004100                    ENDMSG
   861  004100                    L10010:
   862  004100  104023                    EMT     C$MSG
   863
   864
   865
   866  004102                    .IPRI:  PRINTF  #VIRMSG,LORANG,HIRANG
   867  004102  013746  002236            MOV     HIRANG,-(SP)
   868  004106  013746  002234            MOV     LORANG,-(SP)
   869  004112  012746  003457            MOV     #VIRMSG,-(SP)
   870  004116  012746  000003            MOV     #3,-(SP)
   871  004122  010600                    MOV     SP,R0
   872  004124  104017                    EMT     C$PNTF
   873  004126  062706  000010            ADD     #10,SP
   874
   875                                    .EVEN
   876
   877
   878
   879
   880
```

```
                        .SBTTL  GLOBAL SUBROUTINES SECTION

                        ;++
                        ; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
                        ; THAT ARE USED IN MORE THAN ONE TEST.
                        ;--

                        ;++
                        ;FUNCTIONAL DESCRIPTION:
                        ;SUBROUTINE TO COMPUTE A CHECKSUM IN A ROM/EPROM
                        ;INPUT: CONTENTS OF BCF
                        ;IMPLICIT INPUTS: CONTENTS OF PCR
                        ;OUTPUT: A CHECKSUM VALUE STORED IN LOCATION ACTSUM
                        ;CALLING SEQUENCE: JSR PC,CHKSUM
                        ;--

004132  012701  173776  HKSUM: MOV     #173776,R1      ;STORE THE HIGHEST ADDRESS IN THE ROM
004136  063701  002164          ADD     BCF,R1          ;FOR EITHER LOW OR HIGH BYTES
004142  005037  002202          CLR     ACTSUM          ;CLEAR LOCATION WHICH WILL HOLD THE CHECKSUM
004146  012702  173000          MOV     #173000,R2      ;COMPUTE THE LOWEST ADDRESS IN THE ROM
004152  063702  002164          ADD     BCF,R2          ;WHERE THE DATA WILL START
004156  111204          1$:     MOVB    (R2),R4         ;GET DATA IN BYTES
004160  060437  002202          ADD     R4,ACTSUM       ;ADD CONTENTS OF EACH LOCATION TO THE CHECKSUM
004164  062702  000002          ADD     #2,R2           ;ADJUST ADDRESS
004170  020201                  CMP     R2,R1           ;COMPARE CURRENT ADDRESS WITH HIGHEST ADDRESS
004172  002771                  BLT     1$              ;BR IF LESS THAN
004174  000207                  RTS     PC              ;RETURN
```

```
                        ;++
                        ;SUBROUTINE TO INPUT CHECKWORDS FROM THE OPERATOR
                        ;INPUTS: NUMBER OF CHECKWORDS TO INPUT
                        ;        POINTER TO STORAGE AREA
                        ;OUTPUTS: CHECKWORDS STORED IN PROPER TABLE
                        ;CALLING SEQUENCE: JSR  PC,INPUT
                        ;--

004176                  INPUT:  PRINTF  #INSTR                      ;PRINT INSTRUCTIONS
004176  012746  004254          MOV     #INSTR,-(SP)
004202  012746  000001          MOV     #1,-(SP)
004206  010600                  MOV     SP,R0
004210  104017                  EMT     C$PNTF
004212  062706  000004          ADD     #4,SP
004216                  INLP:   GMANID  INWORD,STORE,0,-1,0,177777,NO
004216  104043                  EMT     C$GMAN
004220  000406                  BR      10000$
004222  002220                  .WORD   STORE
004224  000022                  .WORD   T$CODE
004226  004342                  .WORD   INWORD
004230  177777                  .WORD   -1
004232  000000                  .WORD   T$LOLIM
004234  177777                  .WORD   T$HILIM
004236                  10000$:
004236  013722  002220          MOV     STORE,(R2)+                 ;PUT CHECKWORD IN TABLE
004242  005337  002222          DEC     WORDCT                      ;DECREMENT WORD COUNT
004246  001401                  BEQ     1$                          ;BR IF FINISHED
004250  000762                  BR      INLP                        ;LOOP UNTIL TABLE IS COMPLETE
004252  000207                  1$:     RTS     PC                  ;RETURN

004254  040445  054524  042520  INSTR:  .ASCIZ  /%ATYPE IN THE CHECKWORDS AS LISTED IN THE PRINT SET%N/
004262  044440  020116  044124
004270  020105  044103  041505
004276  053513  051117  051504
004304  040440  020123  044514
004312  052123  042105  044440
004320  020116  044124  020105
004326  051120  047111  020124
004334  042523  022524  000116

004342  044103  041505  053513  INWORD: .ASCIZ  /CHECKWORD: /
004350  051117  035104  000040

                                .EVEN
```

```
                                        ;++
                                        ;SUBROUTINE TO COMPUTE THE VIRTUAL ADDRESS OF A BAD
                                        ;PAGE IN MEMORY
                                        ;INPUTS: PAGE IN PAGE CONTROL REGISTER
                                        ;        BYTE CONTROL FLAG (BCF)
                                        ;OUTPUTS: MEMORY RANGE IN WHICH ERROR OCCURRED
                                        ;CALLING SEQUENCE: JSR  PC,VIRTAD
                                        ;--

004356  005001                  VIRTAD: CLR     R1                      ;START AT BOTTOM OF RANGE
004360  012737  000007  002210          MOV     #7,ULIMIT               ;SET UPPER LIMIT OF PAGE
004366  113737  177520  002212          MOVB    PCR,PAGE                ;LOW PAGE ERROR
004374  023737  002212  002210  LPADD:  CMP     PAGE,ULIMIT             ;IS PAGE <=ULIMIT
004402  003427                          BLE     OUTPUT                  ;BR IF YES
004404  022737  000057  002210          CMP     #57,ULIMIT              ;IS ULIMIT = 57
004412  001006                          BNE     1$                      ;BR IF NO
004414  012737  000207  002210          MOV     #207,ULIMIT             ;CHANGE UPPER LIMIT
004422  012701  000020                  MOV     #20,R1                  ;ADJUST MEMORY POINTER
004426  000762                          BR      LPADD                   ;CHECK PAGE AGAIN
004430  062737  000010  0022'0  1$:     ADD     #10,ULIMIT              ;INCREASE UPPER LIMIT
004436  022737  000377  002210          CMP     #377,ULIMIT             ;HAS THE UPPER LIMIT EXCEEDED THE MAX. PAGE
004444  002003                          BGE     2$                      ;BR IF NO
004446                                  ERRDF   40,,PAGERR              ;COULD NOT FIND THE PAGE OF MEMORY
004446  104442                          TRAP    T$ERCODE
004450  000050                          .WORD   40
004452  004060                          .WORD   PAGERR
004454                          2$:     CKLOOP
004454  104006                          EMT     C$CLP1
004456  005201                          INC     R1                      ;ADJUST POINTER
004460  000745                          BR      LPADD                   ;LOOP UNTIL UPPER LIMIT IS FOUND
004462  010137  002234          OUTPUT: MOV     R1,LORANG               ;PULL THE LOW RANGE OUT OF THE TABLE
004466  013737  002234  002236          MOV     LORANG,HIRANG           ;COPY THE DATA
004474  005237  002236                  INC     HIRANG                  ;INCREMENT TO OBTAIN 1K RANGE
004500  005737  002176                  TST     RFLAG                   ;IS IT ROM (2K SEGMENTS)
004504  001402                          BEQ     3$                      ;BR IF NO
004506  005237  002236                  INC     HIRANG                  ;OBTAIN 2K RANGE
004512  000207                  3$:     RTS     PC                      ;RETURN
```

```
                        ;++
                        ;SUBROUTINE TO VERIFY THE CHECKSUM VALUE OF A PAGE
                        ;OF EXISTENT MEMORY AND ALSO TEST FOR THE PROPER CHECKWORD.
                        ;INPUTS: PAGE CONTROL REGISTER, PAGE CHECKWORD.
                        ;OUTPUTS: ERROR FLAGS WHICH POINT TO THE PROPER ERROR MESSAGE
                        ;SUBORDINATE ROUTINES USED: CHKSUM
                        ;CALLING SEQUENCE: JSR  PC,MEMTST
                        ;--

004514  005037  002166        MEMTST: CLR     REAL            ;CLEAR MEMORY INDICATOR
004520  005037  002164        LOBYTE: CLR     BCF             ;SIGNAL LOW BYTES ARE BEING CHECKED
004524  122737  177777  173774        CMPB    #-1,@#173774    ;DOES THE ROM EXIST
004532  001421                        BEQ     HIBYTE          ;BR IF NO
004534  005237  002166                INC     REAL            ;INDICATE THAT MEMORY EXISTS
004540  004737  004132                JSR     PC,CHKSUM       ;COMPUTE THE ACTUAL CHECKSUM
004544  113737  173776  002200        MOVB    @#173776,EXPSUM ;GET THE STORED CHECKSUM
004552  063737  002202  002200        ADD     ACTSUM,EXPSUM   ;ADD THE EXPECTED AND ACTUAL CHECKSUMS
004560  105737  002200                TSTB    EXPSUM          ;TEST RESULTING CHECKBYTE
004564  001404                        BEQ     1$              ;BR IF NO ERROR
004566  012737  000001  002242        MOV     #1,ERRFLG       ;SET CHECHSUM ERROR FLAG
004574  000207                        RTS     PC              ;RETURN
004576                          1$:

004576  012737  000001  002164  HIBYTE: MOV     #1,BCF          ;SET BCF TO DENOTE HIGH BYTES
004604  122737  177777  173775        CMPB    #-1,@#173775    ;DOES THE ROM EXIST
004612  001427                        BEQ     TSTCKW          ;BR IF NO
004614  005737  002166                TST     REAL            ;WAS THERE A LOW ROM?
004620  001003                        BNE     2$              ;BR IF YES
004622  005037  002166                CLR     REAL            ;DENOTE NON-EXISTENT LOW ROM
004626  000207                        RTS     PC              ;RETURN FOR ERROR MESSAGE
004630  005237  002166          2$:   INC     REAL            ;INDICATE MEMORY EXISTS
004634  004737  004132                JSR     PC,CHKSUM       ;COMPUTE CHECKSUM
004640  113737  173777  002200        MOVB    @#173777,EXPSUM ;GET EXPECTED CHECKSUM
004646  063737  002202  002200        ADD     ACTSUM,EXPSUM   ;ADD THE EXPECTED AND ACTUAL CHECKSUMS
004654  105737  002200                TSTB    EXPSUM          ;TEST RESULTING CHECKBYTE
004660  001404                        BEQ     TSTCKW          ;BR IF EQUAL
004662  012737  000001  002242        MOV     #1,ERRFLG       ;SET CHECKSUM ERROR FLAG
004670  000207                        RTS     PC              ;RETURN

004672  005737  002166        TSTCKW: TST     REAL            ;ANY MEMORY?
004676  001420                        BEQ     5$              ;BR IF NO
004700  022737  000001  002166        CMP     #1,REAL         ;SINGLE ROM?
004706  001005                        BNE     3$              ;BR IF NO
004710  123737  002226  173776        CMPB    CKWD,@#173776   ;COMPARE CHECKBYTE ONLY
004716  001005                        BNE     4$              ;BR IF ERROR
004720  000207                        RTS     PC              ;RETURN -- NO ERROR
004722  023737  002226  173776  3$:   CMP     CKWD,@#173776   ;COMPARE CHECKWORD
004730  001403                        BEQ     5$              ;BR IF NO ERROR
004732  012737  000002  002242  4$:   MOV     #2,ERRFLG       ;DENOTE CHECKSUM ERROR
004740  000207                  5$:   RTS     PC              ;RETURN
```

```
                        ;++
                        ;SUBROUTINE TO COMPUTE THE ACTUAL STARTING PAGE
                        ;OF MEMORY IN WHICH THE MEMORY CHIP IS TO BE
                        ;ADDRESSED.
                        ;INPUTS: THE LOW NUMBER IN THE MEMORY RANGE
                        ;        (I.E. X IN X-Y K)
                        ;OUTPUT: PAGE NUMBER IN PCR WHICH DENOTES WHERE TESTING
                        ;        SHOULD BEGIN.
                        ;CALLING SEQUENCE: JSR  PC,SETADR
                        ;--

004742  013701  002220  SETADR: MOV     STORE,R1        ;COPY DATA
004746  020127  000005          CMP     R1,#5           ;IS THE NUMBER <=5?
004752  003006                  BGT     1$              ;BR IF NO
004754  000241                  CLC                     ;CLEAR C-BIT FOR ROTATE
004756  006101                  ROL     R1              ;ROTATE TO MULTIPLY
004760  006101                  ROL     R1              ;  BY 10 (8)
004762  006101                  ROL     R1              ;
004764  110104                  MOVB    R1,R4           ;COPY DATA
004766  000413                  BR      LOAD            ;LOAD THE PCR
004770  012704  000020  1$:     MOV     #20,R4          ;START WITH 16 (10)
004774  012705  000200          MOV     #200,R5         ;CORRESPONDIGE PAGE IS 200
005000  020104          LOOP:   CMP     R1,R4           ;PAGE FOUND?
005002  001404                  BEQ     2$              ;BR IF YES
005004  005204                  INC     R4              ;NEXT PAGE
005006  062705  000010          ADD     #10,R5          ;NEXT PAGE
005012  000772                  BR      LOOP            ;LOOP UNTIL PAGE IS FOUND
005014  010504          2$:     MOV     R5,R4           ;GET PAGE FOR PCR
005016  110437  002170  LOAD:   MOVB    R4,LOPAG        ;LOW STARTING PAGE
005022  005204                  INC     R4              ;INCREMENT
005024  110437  002171          MOVB    R4,LOPAG+1      ;HIGH STARTING PAGE
005030  000207                  RTS     PC
```

```
                                        .TITLE MISCELLANEOUS SECTIONS
                                        .SBTTL  IDENTIFICATION


                                        .SBTTL  REPORT CODING SECTION

005032                                          BGNRPT
005032                                  L$RPT::
005032                                          ENDRPT
005032                                  L10011:
005032  104025                                  EMT     C$RPT


                                        .SBTTL  INITIALIZE SECTION

                                        ;++
                                        ; THE INITIALIZE SECTION CONTAINS THE CODING THAT IS PERFORMED
                                        ; AT THE BEGINNING OF EACH PASS.
                                        ;--

005034                                          BGNINIT
005034                                  L$INIT::
005034                                          GPHARD  #0,R1                   ;GET POINTER TO BASE ADDRESS OF P-TABLE
005034  012700  000000                          MOV     #0,R0
005040  104042                                  EMT     C$GPHRD
005042  010001                                  MOV     R0,R1
005044  016137  000002  002214                  MOV     2(R1),VECT              ;GET INTERRUPT VECTOR
005052  016137  000004  002224                  MOV     4(R1),PRIOR             ;GET PRIORITY LEVEL
005060  016137  000006  002216                  MOV     6(R1),SWSET             ;GET ROCKER SWITCH SETTINGS
005066                                          SETPRI  #PRI07                  ;INHIBIT INTERRUPTS
005066  012700  000340                          MOV     #PRI07,R0
005072  104041                                  EMT     C$SPRI
005074                                          MANUAL                          ;MANUAL INTERVENTION OK?
005074  104051                                  EMT     C$MANI
005076                                          BNCOMPLETE      OUT             ;BR IF NO
005076  103010                                  BCC     OUT
005100                                          PRINTF  #IDENT                  ;PRINT PROGRAM I.D.
005100  012746  005124                          MOV     #IDENT,-(SP)
005104  012746  000001                          MOV     #1,-(SP)
005110  010600                                  MOV     SP,R0
005112  104017                                  EMT     C$PNTF
005114  062706  000004                          ADD     #4,SP
005120                                  OUT:
005120                                          EXIT    INIT
005120  104032                                  EMT     C$EXIT
005122  000054                                  .WORD   L10012-.

005124  040445  042102  030526          IDENT:  .ASCIZ  '%ABDv11-AA BOOTSTRAP DIAGNOSTIC PROGRAM%N'
005132  026461  040501  041040
005140  047517  051524  051124
005146  050101  042040  040511
005154  047107  051517  044524
005162  020103  051120  043517
005170  040522  022515  000116

                                        .EVEN
```

```
 1149
 1150  005176                                 ENDINIT
 1151  005176                          L10012:
 1152  005176  104011                         EMT     C$INIT
```

```
                                        .SBTTL  CLEANUP CODING SECTION

                                        ;++
                                        ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
                                        ; AT THE END OF EACH PASS.
                                        ;--

005200                                          BGNCLN
005200                                  L$CLEAN::

005200  005037  177520                          CLR     PCR                     ;CLEAR PAGE CONTROL REGISTER
005204  005037  177522                          CLR     RWREG                   ;CLEAR READ/WRITE REGISTER
005210  012737  000001  002232                  MOV     #1,RSET                 ;RESTORE DEFAULT VALUE
005216  005037  002230                          CLR     RESPND                  ;RESTORE DEFAULT
005222  005037  013540                          CLR     ADDON                   ;RESTORE DEFAULT
005226  012737  000001  002174                  MOV     #1,ANSR                 ;RESTORE DEFAULT
005234  005237  002204                          INC     PASS                    ;INCREMENT PASS COUNT
005240  005237  002206                          INC     PASCT                   ;INCREMENT TEST 4 PASS COUNT
005244                                          CLRVEC  VECT                    ;CLEAR INTERRUPT VECTOR
005244  013700  002214                          MOV     VECT,R0
005250  104036                                  EMT     C$CVEC

005252                                          EXIT    CLN
005252  104032                                  EMT     C$EXIT
005254  000002                                  .WORD   L10013-.

005256                                          ENDCLN
005256                                  L10013:
005256  104012                                  EMT     C$CLEAN
```

```
1185                                    .TITLE HARDWARE TESTS
1186                                    .SBTTL  IDENTIFICATION
1187
1188
1189                                    .SBTTL  TEST 1: READ/WRITE REGISTER TEST
1190                                    ;++
1191                                    ;TEST TO VERIFY THAT THE READ/WRITE REGISTER AT ADDRESS 177522
1192                                    ;IS WORD AND BYTE ADDRESSABLE.
1193                                    ;--
1194
1195            177522                          RWREG=177522
1196
1197   005260                           BGNTST
1198
1199   005260                           BGNSUB
1200   005260  104002                   EMT     C$BSUB
1201   005262  005037  177522           CLR     RWREG                   ;LOAD ALL ZEROS
1202   005266  001411                   BEQ     1$                      ;BR IF CLEAR
1203   005270  005001                   CLR     R1                      ;EXPECTED DATA
1204   005272  013702  177522           MOV     RWREG,R2                ;COPY CONTENTS
1205   005276                           ERRDF   1,RWR,RERR1,CKLOOP      ;REGISTER CANNOT HOLD ALL ZEROS
1206   005276  104562                   TRAP    T$ERCODE
1207   005300  000001                   .WORD   1
1208   005302  002522                   .WORD   RWR
1209   005304  003564                   .WORD   RERR1
1210   005306                           EXIT    TST                     ;ABORT TEST IF LOOP ON ERROR NOT SELECTED
1211   005306  104032                   EMT     C$EXIT
1212   005310  000566                   .WORD   L10014-.
1213   005312                  1$:      CKLOOP                          ;LOOP ON ERROR IF SELECTED
1214   005312  104006                   EMT     C$CLP1
1215   005314                           ENDSUB
1216   005314                  L10015:
1217   005314  104003                   EMT     C$ESUB
1218
1219   005316                           BGNSUB
1220   005316  104002                   EMT     C$BSUB
1221   005320  012737  177777  177522  MOV     #-1,RWREG               ;LOAD ALL ONES
1222   005326  022737  177777  177522  CMP     #177777,RWREG           ;CHECK THE REGISTER
1223   005334  001412                   BEQ     2$                      ;BR IF HOLDING GOOD DATA
1224   005336  012701  177777           MOV     #-1,R1                  ;EXPECTED DATA
1225   005342  013702  177522           MOV     RWREG,R2                ;COPY CONTENTS
1226   005346                           ERRDF   2,RWR,RERR2,CKLOOP      ;REGISTER CANNOT HOLD ALL ONES
1227   005346  104562                   TRAP    T$ERCODE
1228   005350  000002                   .WORD   2
1229   005352  002522                   .WORD   RWR
1230   005354  003632                   .WORD   RERR2
1231   005356                           EXIT    TST                     ;ABORT TEST IF ERROR AND NO LOOPING
1232   005356  104032                   EMT     C$EXIT
1233   005360  000516                   .WORD   L10014-.
1234   005362                  2$:      CKLOOP                          ;LOOP ON ERROR IF SELECTED
1235   005362  104006                   EMT     C$CLP1
1236   005364                           ENDSUB
1237   005364                  L10016:
1238   005364  1040C3                   EMT     C$ESUB
1239
1240   005366                           BGNSUB
```

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1241  005366  104002                          EMT     C$BSUB
1242  005370  012737  125252  177522          MOV     #125252,RWREG           ;LOAD ALTERNATING 1'S AND 0'S BIT PATTERN
1243  005376  022737  125252  177522          CMP     #125252,RWREG           ;CHECK DATA
1244  005404  001412                          BEQ     3$                      ;BR IF GOOD
1245  005406  012701  125252                  MOV     #125252,R1              ;EXPECTED DATA
1246  005412  013702  177522                  MOV     RWREG,R2                ;COPY CONTENTS
1247  005416                                  ERRDF   3,RWR,RERR3,CKLOOP      ;CANNOT HOLD GOOD DATA
1248  005416  104562                          TRAP    T$ERCODE
1249  005420  000003                          .WORD   3
1250  005422  002522                          .WORD   RWR
1251  005424  003700                          .WORD   RERR3
1252  005426                                  EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1253  005426  104032                          EMT     C$EXIT
1254  005430  000446                          .WORD   L10014-.
1255  005432                          3$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
1256  005432  104006                          EMT     C$CLP1
1257  005434                                  ENDSUB
1258  005434                          L10017:
1259  005434  104003                          EMT     C$FSUB
1260
1261  005436                                  BGNSUB
1262  005436  104002                          EMT     C$BSUB
1263  005440  105037  177522                  CLRB    RWREG                   ;CLEAR THE REGISTER'S LOW BYTE
1264  005444  022737  125000  177522          CMP     #125000,RWREG           ;DID IT CLEAR PROPERLY?
1265  005452  001412                          BEQ     4$                      ;BR IF YES
1266  005454  012701  125000                  MOV     #125000,R1              ;EXPECTED DATA
1267  005460  013702  177522                  MOV     RWREG,R2                ;COPY CONTENTS
1268  005464                                  ERRDF   4,RWR,RERR4,CKLOOP      ;DID NOT RESPOND PROPERLY TO BYTE INSTRUCTION
1269  005464  104562                          TRAP    T$ERCODE
1270  005466  000004                          .WORD   4
1271  005470  002522                          .WORD   RWR
1272  005472  003746                          .WORD   RERR4
1273  005474                                  EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1274  005474  104032                          EMT     C$EXIT
1275  005476  000400                          .WORD   L10014-.
1276  005500                          4$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
1277  005500  104006                          EMT     C$CLP1
1278  005502                                  ENDSUB
1279  005502                          L10020:
1280  005502  104003                          EMT     C$ESUB
1281
1282  005504                                  BGNSUB
1283  005504  104002                          EMT     C$BSUB
1284  005506  000337  177522                  SWAB    RWREG                   ;SWAP BYTES IN THE REGISTER
1285  005512  022737  000252  177522          CMP     #252,RWREG              ;GOOD DATA?
1286  005520  001406                          BEQ     5$                      ;BR IF YES
1287  005522                                  ERRDF   5,RWR,RERR4,CKLOOP      ;BYTE INSTRUCTION ERROR
1288  005522  104562                          TRAP    T$ERCODE
1289  005524  000005                          .WORD   5
1290  005526  002522                          .WORD   RWR
1291  005530  003746                          .WORD   RERR4
1292  005532                                  EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1293  005532  104032                          EMT     C$EXIT
1294  005534  000342                          .WORD   L10014-.
1295  005536                          5$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
1296  005536  104006                          EMT     C$CLP1
```

```
1297  005540                                          ENDSUB
1298  005540                                  L10021:
1299  005540  104003                                 EMT     C$ESUB
1300
1301  005542                                          BGNSUB
1302  005542  104002                                 EMT     C$BSUB
1303  005544  012737  052525  177522                 MOV     #052525,RWREG           ;LOAD AN ALTERNATING 0'S AND 1'S BIT PATTERN
1304  005552  022737  052525  177522                 CMP     #052525,RWREG           ;CHECK IT
1305  005560  001412                                 BEQ     6$                      ;BR IF GOOD DATA
1306  005562  012701  052525                         MOV     #052525,R1              ;EXPECTED DATA
1307  005566  013702  177522                         MOV     RWREG,R2                ;COPY CONTENTS
1308  005572                                          ERRDF   6,RWR,RERR3,CKLOOP      ;CANNOT HOLD GOOD DATA
1309  005572  104562                                 TRAP    T$ERCODE
1310  005574  000006                                 .WORD   6
1311  005576  002522                                 .WORD   RWR
1312  005600  003700                                 .WORD   RERR3
1313  005602                                          EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1314  005602  104032                                 EMT     C$EXIT
1315  005604  000272                                 .WORD   L10014-.
1316  005606                                  6$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
1317  005606  104006                                 EMT     C$CLP1
1318  005610                                          ENDSUB
1319  005610                                  L10022:
1320  005610  104003                                 EMT     C$ESUB
1321
1322  005612                                          BGNSUB
1323  005612  104002                                 EMT     C$BSUB
1324  005614  105037  177523                         CLRB    RWREG+1                 ;CLEAR HIGH BYTE OF REGISTER
1325  005620  022737  000125  177522                 CMP     #125,RWREG              ;CHECK THE RESULTING CONTENTS OF THE REGISTER
1326  005626  001412                                 BEQ     7$                      ;BR IF GOOD DATA
1327  005630  012701  000125                         MOV     #125,R1                 ;EXPECTED DATA
1328  005634  013702  177522                         MOV     RWREG,R2                ;COPY CONTENTS
1329  005640                                          ERRDF   7,RWR,RERR4,CKLOOP      ;BYTE INSTRUCTION ERROR
1330  005640  104562                                 TRAP    T$ERCODE
1331  005642  000007                                 .WORD   7
1332  005644  002522                                 .WORD   RWR
1333  005646  003746                                 .WORD   RERR4
1334  005650                                          EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1335  005650  104032                                 EMT     C$EXIT
1336  005652  000224                                 .WORD   L10014-.
1337  005654                                  7$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
1338  005654  104006                                 EMT     C$CLP1
1339  005656                                          ENDSUB
1340  005656                                  L10023:
1341  005656  104003                                 EMT     C$ESUB
1342
1343  005660                                          BGNSUB
1344  005660  104002                                 EMT     C$BSUB
1345  005662  000337  177522                         SWAB    RWREG                   ;SWAP BYTES
1346  005666  022737  052400  177522                 CMP     #052400,RWREG           ;DATA GOOD?
1347  005674  001412                                 BEQ     10$                     ;BR IF YES
1348  005676  012701  052400                         MOV     #52400,R1               ;EXPECTED DATA
1349  005702  013702  177522                         MOV     RWREG,R2                ;COPY CONTENTS
1350  005706                                          ERRDF   10,RWR,RERR4,CKLOOP     ;BYTE INSTRUCTION ERROR
1351  005706  104562                                 TRAP    T$ERCODE
1352  005710  000012                                 .WORD   10
```

```
1353  005712  002522                        .WORD   RWR
1354  005714  003746                        .WORD   RERR4
1355  005716                                EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1356  005716  104032                        EMT     C$EXIT
1357  005720  000156                        .WORD   L10014-.
1358  005722                        10$:    CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
1359  005722  104006                        EMT     C$CLP1
1360  005724                                ENDSUB
1361  005724                        L10024:
1362  005724  104003                        EMT     C$ESUB
1363
1364  005726                                BGNSUB
1365  005726  104002                        EMT     C$BSUB
1366  005730  005037  177522                CLR     RWREG                   ;MAKE SURE THE C-BIT IS CLEAR
1367  005734  052737  100000  177522        BIS     #BIT15,RWREG            ;SET MSB
1368  005742  013703  177522                MOV     RWREG,R3                ;COPY DATA IN RWREG
1369  005746  023703  177522        ROTLP1: CMP     RWREG,R3                ;ARE THEY THE SAME?
1370  005752  001005                        BNE     11$                     ;BR IF NO
1371  005754  006003                        ROR     R3                      ;ROTATE THE SET BIT
1372  005756  001411                        BEQ     12$                     ;BR WHEN FINISHED
1373  005760  006037  177522                ROR     RWREG                   ;REPEAT ROTATE
1374  005764  000770                        BR      ROTLP1                  ;LOOP UNTIL ROTATE IS COMPLETE
1375  005766                        11$:    ERRDF   11,RWR,RERR5,CKLOOP
1376  005766  104562                        TRAP    T$ERCODE
1377  005770  000013                        .WORD   11
1378  005772  002522                        .WORD   RWR
1379  005774  004014                        .WORD   RERR5
1380  005776                                EXIT    TST                     ;SKIP REST OF TEST
1381  005776  104032                        EMT     C$EXIT
1382  006000  000076                        .WORD   L10014-.
1383  006002                        12$:    CKLOOP                          ;CHECK FOR LOOP ON ERROR
1384  006002  104006                        EMT     C$CLP1
1385  006004                                ENDSUB
1386  006004                        L10025:
1387  006004  104003                        EMT     C$ESUB
1388
1389  006006                                BGNSUB
1390  006006  104002                        EMT     C$BSUB
1391  006010  012737  177777  177522        MOV     #-1,RWREG               ;SET ALL ONES
1392  006016  042737  100000  177522        BIC     #BIT15,RWREG            ;CLEAR MSB
1393  006024  013703  177522                MOV     RWREG,R3                ;COPY DATA
1394  006030  023703  177522        ROTLP2: CMP     RWREG,R3                ;ARE THEY THE SAME?
1395  006034  001010                        BNE     13$                     ;BR IF NO
1396  006036  000261                        SEC                             ;SET C-BIT FOR ROTATE
1397  006040  006037  177522                ROR     RWREG                   ;ROTATE CLEAR BIT
1398  006044  006003                        ROR     R3                      ;REPEAT
1399  006046  022703  077777                CMP     #077777,R3              ;FINISHED?
1400  006052  001366                        BNE     ROTLP2                  ;BR IF NOT YET
1401  006054  000406                        BR      14$                     ;SUBTEST FINISHED
1402  006056                        13$:    ERRDF   12,RWR,RERR6,CKLOOP
1403  006056  104562                        TRAP    T$ERCODE
1404  006060  000014                        .WORD   12
1405  006062  002522                        .WORD   RWR
1406  006064  004036                        .WORD   RERR6
1407  006066                                EXIT    TST
1408  006066  104032                        EMT     C$EXIT
```

```
 1409  006070  000006                        .WORD   L10014-.
 1410  006072                        14$:    CKLOOP
 1411  006072  104006                        EMT     C$CLP1
 1412  006074                                ENDSUB
 1413  006074                        L10026:
 1414  006074  104003                        EMT     C$ESUB
 1415
 1416  006076                                ENDTST
 1417  006076                        L10014:
 1418  006076  104[illegible]                EMT     C$ETST
```

```
                        .SBTTL  TEST 2: PAGE CONTROL REGISTER TEST
                        ;++
                        ;TEST TO VERIFY THAT THE PAGE CONTROL REGISTER IS WORD
                        ;AND BYTE ADDRESSABLE.
                        ;--

006100                          BGNTST

006100                          BGNSUB
006100  104002                 EMT     C$BSUB
006102  005037  177520          CLR     PCR                     ;LOAD ALL ZEROS
006106  001417                 BEQ     1$                      ;BR IF CLEARED
006110  005001                 CLR     R1                      ;EXPECTED DATA
006112  013702  177520          MOV     PCR,R2                  ;COPY CONTENTS
006116                          ERRDF   13,PACR,RERR1,CKLOOP    ;REGISTER CANNOT HOLD ALL ZEROS
006116  104562                 TRAP    T$ERCODE
006120  000015                 .WORD   13
006122  002566                 .WORD   PACR
006124  003564                 .WORD   RERR1
006126                          EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
006126  104032                 EMT     C$EXIT
006130  000576                 .WORD   L10027-.
006132                  1$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
006132  104006                 EMT     C$CLP1
006134                          ENDSUB
006134                  L10030:
006134  104003                 EMT     C$ESUB

006136                          BGNSUB
006136  104002                 EMT     C$BSUB
006140  012737  177777  177520  MOV     #-1,PCR                 ;LOAD ALL ONES
006146  022737  177777  177520  CMP     #177777,PCR             ;CHECK FOR GOOD DATA
006154  001412                 BEQ     2$                      ;BR IF GOOD
006156  012701  177777          MOV     #-1,R1                  ;EXPECTED DATA
006162  013702  177520          MOV     PCR,R2                  ;COPY CONTENTS
006166                          ERRDF   14,PACR,RERR2,CKLOOP    ;REGISTER CANNOT HOLD ALL ONES
006166  104562                 TRAP    T$ERCODE
006170  000016                 .WORD   14
006172  002566                 .WORD   PACR
006174  003632                 .WORD   RERR2
006176                          EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
006176  104032                 EMT     C$EXIT
006200  000526                 .WORD   L10027-.
006202                  2$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
006202  104006                 EMT     C$CLP1
006204                          ENDSUB
006204                  L10031:
006204  104003                 EMT     C$ESUB

006206                          BGNSUB
006206  104002                 EMT     C$BSUB
006210  012737  125252  177520  MOV     #125252,PCR             ;LOAD AN ALTERNATING 1'S AND 0'S BIT PATTERN
006216  022737  125252  177520  CMP     #125252,PCR             ;CHECK THE RESULTS
006224  001412                 BEQ     3$                      ;BR IF GOOD DATA
006226  012701  125252          MOV     #125252,R1              ;EXPECTED DATA
```

```
1475  006232  013702  177520          MOV     PCR,R2                  ;COPY CONTENTS
1476  006236                          ERRDF   15,PACR,RERR3,CKLOOP    ;REGISTER CANNOT HOLD GOOD DATA
1477  006236  104562                  TRAP    T$ERCODE
1478  006240  000017                  .WORD   15
1479  006242  002566                  .WORD   PACR
1480  006244  003700                  .WORD   RERR3
1481  006246                          EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1482  006246  104032                  EMT     C$EXIT
1483  006250  000456                  .WORD   L10027-.
1484  006252                  3$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
1485  006252  104006                  EMT     C$CLP1
1486  006254                          ENDSUB
1487  006254                  L10032:
1488  006254  104003                  EMT     C$ESUB
1489
1490  006256                          BGNSUB
1491  006256  104002                  EMT     C$BSUB
1492  006260  105037  177520          CLRB    PCR                     ;CLEAR THE REGISTER'S LOW BYTE
1493  006264  022737  125000  177520  CMP     #125000,PCR             ;COMPARE THE RESULTS
1494  006272  001412                  BEQ     4$                      ;BR IF GOOD DATA
1495  006274  012701  125000          MOV     #125000,R1              ;EXPECTED DATA
1496  006300  013702  177520          MOV     PCR,R2                  ;COPY CONTENTS
1497  006304                          ERRDF   16,PACR,RERR4,CKLOOP    ;BYTE INSTRUCTION ERROR
1498  006304  104562                  TRAP    T$ERCODE
1499  006306  000020                  .WORD   16
1500  006310  002566                  .WORD   PACR
1501  006312  003746                  .WORD   RERR4
1502  006314                          EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1503  006314  104032                  EMT     C$EXIT
1504  006316  000410                  .WORD   L10027-.
1505  006320                  4$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
1506  006320  104006                  EMT     C$CLP1
1507  006322                          ENDSUB
1508  006322                  L10033:
1509  006322  104003                  EMT     C$FSUB
1510
1511  006324                          BGNSUB
1512  006324  104002                  EMT     C$BSUB
1513  006326  000337  177520          SWAB    PCR                     ;SWAP BYTES
1514  006332  022737  000252  177520  CMP     #252,PCR                ;CHECK THE RESULTS
1515  006340  001412                  BEQ     5$                      ;BR IF GOOD DATA
1516  006342  012701  000252          MOV     #252,R1                 ;EXPECTED DATA
1517  006346  013702  177520          MOV     PCR,R2                  ;COPY CONTENTS
1518  006352                          ERRDF   17,PACR,RERR4,CKLOOP    ;BYTE INSTRUCTION ERROR
1519  006352  104562                  TRAP    T$ERCODE
1520  006354  000021                  .WORD   17
1521  006356  002566                  .WORD   PACR
1522  006360  003746                  .WORD   RERR4
1523  006362                          EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1524  006362  104032                  EMT     C$EXIT
1525  006364  000342                  .WORD   L10027-.
1526  006366                  5$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
1527  006366  104006                  EMT     C$CLP1
1528  006370                          ENDSUB
1529  006370                  L10034:
1530  006370  104003                  EMT     C$ESUB
```

```
1531  006372                                    BGNSUB
1532  006372  104002                            EMT     C$BSUB
1533  006374  012737  052525  177520            MOV     #052525,PCR             ;LOAD AN ALTERNATING 0'S AND 1'S BIT PATTERN
1534  006402  022737  052525  177520            CMP     #052525,PCR             ;CHECK THE RESULTS
1535  006410  001412                            BEQ     6$                      ;BR IF GOOD DATA
1536  006412  012701  052525                    MOV     #052525,R1              ;EXPECTED DATA
1537  006416  013702  177520                    MOV     PCR,R2                  ;COPY CONTENTS
1538  006422                                    ERRDF   20,PACR,RERR3,CKLOOP    ;REGISTER CANNOT HOLD GOOD DATA
1539  006422  104562                            TRAP    T$ERCODE
1540  006424  000024                            .WORD   20
1541  006426  002566                            .WORD   PACR
1542  006430  003700                            .WORD   RERR3
1543  006432                                    EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1544  006432  104032                            EMT     C$EXIT
1545  006434  000272                            .WORD   L10027-.
1546  006436                            6$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
1547  006436  104006                            EMT     ^$CLP1
1548  006440                                    ENDSUB
1549  006440                            L10035:
1550  006440  104003                            EMT     C$ESUB
1551  006442                                    BGNSUB
1552  006442  104002                            EMT     C$BSUB
1553  006444  105037  177521                    CLRB    PCR+1                   ;CLEAR THE HIGH BYTE
1554  006450  022737  000125  177520            CMP     #125,PCR                ;CHECK THE REGISTER CONTENTS
1555  006456  001412                            BEQ     7$                      ;BR IF GOOD DATA
1556  006460  012701  000125                    MOV     #125,R1                 ;EXPECTED DATA
1557  006464  013702  177520                    MOV     PCR,R2                  ;COPY CONTENTS
1558  006470                                    ERRDF   21,PACR,RERR4,CKLOOP    ;BYTE INSTRUCTION ERROR
1559  006470  104562                            TRAP    T$ERCODE
1560  006472  000025                            .WORD   21
1561  006474  002566                            .WORD   PACR
1562  006476  003746                            .WORD   RERR4
1563  006500                                    EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1564  006500  104032                            EMT     C$EXIT
1565  006502  000224                            .WORD   L10027-.
1566  006504                            7$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
1567  006504  104006                            EMT     C$CLP1
1568  006506                                    ENDSUB
1569  006506                            L10036:
1570  006506  104003                            EMT     C$ESUB
1571
1572  006510                                    BGNSUB
1573  006510  104002                            EMT     C$BSUB
1574  006512  000337  177520                    SWAB    PCR                     ;SWAP BYTES
1575  006516  022737  052400  177520            CMP     #052400,PCR             ;CHECK RESULTING CONTENTS
1576  006524  001412                            BEQ     10$                     ;BR IF GOOD DATA
1577  006526  012701  052400                    MOV     #52400,R1               ;EXPECTED DATA
1578  006532  013702  177520                    MOV     PCR,R2                  ;COPY CONTENTS
1579  006536                                    ERRDF   22,PACR,RERR4,CKLOOP    ;BYTE INSTRUCTION ERROR
1580  006536  104562                            TRAP    T$ERCODE
1581  006540  000026                            .WORD   22
1582  006542  002566                            .WORD   PACR
1583  006544  003746                            .WORD   RERR4
1584  006546                                    EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1585  006546  104032                            EMT     C$EXIT
1586  006550  000224                            .WORD   L10027-.
```

```
1587  006552                          10$:    CKLOOP                          ;CHECK FOR LOOP ON ERROR
1588  006552  104006                          EMT     C$CLP1
1589  006554                                  ENDSUB
1590  006554                          L10037:
1591  006554  104003                          EMT     C$ESUB
1592
1593  006556                                  BGNSUB
1594  006556  104002                          EMT     C$BSUB
1595  006560  005037  177520                  CLR     PCR                     ;MAKE SURE THE C-BIT IS CLEAR
1596  006564  052737  100000  177520          BIS     #BIT15,PCR              ;SET MSB
1597  006572  013703  177520                  MOV     PCR,R3                  ;COPY DATA IN PCR
1598  006576  023703  177520          ROTLP3: CMP     PCR,R3                  ;ARE THEY THE SAME?
1599  006602  001005                          BNE     11$                     ;BR IF NO
1600  006604  006003                          ROR     R3                      ;ROTATE THE SET BIT
1601  006606  001411                          BEQ     12$                     ;BR IF FINISHED
1602  006610  006037  177520                  ROR     PCR                     ;REPEAT ROTATE
1603  006614  000770                          BR      ROTLP3                  ;LOOP UNTIL ROTATE IS COMPLETE
1604  006616                          11$:    ERRDF   23,PACR,RERR5,CKLOOP
1605  006616  104562                          TRAP    T$ERCODE
1606  006620  000027                          .WORD   23
1607  006622  002566                          .WORD   PACR
1608  006624  004014                          .WORD   RERR5
1609  006626                                  EXIT    TST                     ;SKIP REST OF TEST
1610  006626  104032                          EMT     C$EXIT
1611  006630  000076                          .WORD   L10027-.
1612  006632                          12$:    CKLOOP                          ;CHECK FOR LOOP ON ERROR
1613  006632  104006                          EMT     C$CLP1
1614  006634                                  ENDSUB
1615  006634                          L10040:
1616  006634  104003                          EMT     C$ESUB
1617
1618  006636                                  BGNSUB
1619  006636  104002                          EMT     C$BSUB
1620  006640  012737  177777  177520          MOV     #-1,PCR                 ;SET ALL ONES
1621  006646  042737  100000  177520          BIC     #BIT15,PCR              ;CLEAR MSB
1622  006654  013703  177520                  MOV     PCR,R3                  ;COPY DATA
1623  006660  023703  177520          ROTLP4: CMP     PCR,R3                  ;ARE THEY THE SAME?
1624  006664  001010                          BNE     13$                     ;BR IF NO
1625  006666  000261                          SEC                             ;SET C-BIT FOR ROTATE
1626  006670  006037  177520                  ROR     PCR                     ;ROTATE CLEAR BIT
1627  006674  006003                          ROR     R3                      ;REPEAT
1628  006676  022703  077777                  CMP     #077777,R3              ;ALL ONES?
1629  006702  001366                          BNE     ROTLP4                  ;BR IF NOT YET
1630  006704  000406                          BR      14$                     ;SUBTEST FINISHED
1631  006706                          13$:    ERRDF   24,PACR,RERR6,CKLOOP
1632  006706  104562                          TRAP    T$ERCODE
1633  006710  000030                          .WORD   24
1634  006712  002566                          .WORD   PACR
1635  006714  004036                          .WORD   RERR6
1636  006716                                  EXIT TST
1637  006716  104032                          EMT     C$EXIT
1638  006720  000006                          .WORD   L10027-.
1639  006722                          14$:    CKLOOP
1640  006722  104006                          EMT     C$CLP1
1641  006724                                  ENDSUB
1642  006724                          L10041:
```

```
1643  006724  104003                          EMT     C$ESUB
1644  006726                                  ENDTST
1645  006726                          L10027:
1646  006726  104001                          EMT     C$ETST
1647
```

```
                                        .SBTTL  TEST 3: BEVENT CLAMP ENABLE TEST
                                        ;++
                                        ;TEST TO VERIFY THAT THE BEVENT CLAMP CAN BE ENABLED. THIS TEST
                                        ;ASSUMES THAT SWITCH #5 OF E21 IS IN THE ON POSITION, AND THE M8012
                                        ;MODULE IS LOCATED IN THE SAME BACKPLANE THAT THE LINE TIME CLOCK
                                        ;IS GENERATED FROM.
                                        ;--

006730                                          BGNTST

        177546                          BEVREG=177546

006730  005737  002204                  TST     PASS            ;IF THIS IS FIRST PASS
006734  001402                          BEQ     1$              ;THEN DO THE TEST
006736                                  EXIT    TST             ;ELSE DON'T
006736  104032                          EMT     C$EXIT
006740  000520                          .WORD   .10042-.
006742                          1$:     BGNSUB
006742  104002                          EMT     C$BSUB
006744                                  SETVEC  VECT,#INTSR,#PRI07      ;SET INTERRUPT VECTOR,INHIBIT INTERRUPTS
006744  012746  000340                  MOV     #PRI07,-(SP)
006750  012746  007134                  MOV     #INTSR,-(SP)
006754  013746  002214                  MOV     VECT,-(SP)
006760  012746  000003                  MOV     #3,-(SP)
006764  104037                          EMT     C$SVEC
006766  062706  000010                  ADD     #10,SP
006772  052737  000100  177546          BIS     #BIT06,BEVREG           ;REMOVE BEVENT CLAMP
007000                                  SETPRI  #PRI00                  ;ALLOW INTERRUPTS
007000  012700  000000                  MOV     #PRI00,R0
007004  104041                          EMT     C$SPRI
007006                                  WAITUS  #400.                   ;DELAY 40 MSECS.
007006  012700  000620                  MOV     #400.,R0
007012  104027                          EMT     C$WTU
007014                                  SETPRI  #PRI07                  ;INHIBIT FURTHER INTERRUPTS
007014  012700  000340                  MOV     #PRI07,R0
007020  104041                          EMT     C$SPRI
007022  022737  000002  007142          CMP     #2,ICOUNT               ;DID THE MINIMUM OF TWO INTERRUPTS OCCUR?
007030  003403                          BLE     2$                      ;BR IF YES
007032                                  ERRDF   25,,BVERR1,CKLOOP       ;BEVENT CLAMP ENABLE FAILED
007032  104542                          TRAP    T$ERCODE
007034  000031                          .WORD   25
007036  007144                          .WORD   BVERR1
007040                          2$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
007040  104006                          EMT     C$CLP1
007042  005037  007142                  CLR     ICOUNT                  ;CLEAR INTERRUPT COUNT
007046                                  ENDSUB
007046                          L10043:
007046  104003                          EMT     C$ESUB

007050                                  BGNSUB
007050  104002                          EMT     C$BSUB
007052  042737  000100  177546          BIC     #BIT06,BEVREG           ;SET BEVENT CLAMP
007060                                  SETPRI  #PRI00                  ;ALLOW INTERRUPTS
007060  012700  000000                  MOV     #PRI00,R0
007064  104041                          EMT     C$SPRI
007066                                  WAITUS  #400.                   ;DELAY 40 MSECS.
```

```
1704  007066  012700  000620          MOV     #400.,R0
1705  007072  104027                  EMT     C$WTU
1706  007074                          SETPRI  #PRI07                  ;SET HIGHEST PRIORITY
1707  007074  012700  000340          MOV     #PRI07,R0
1708  007100  104041                  EMT     C$SPRI
1709  007102  022737  000001  007142  CMP     #1,ICOUNT               ;CHECK INTERRUPT COUNT
1710  007110  002003                  BGE     4$                      ;BR IF NO INTERRUPTS OCCURRED
1711  007112                          ERRDF   26.,BVERR2,CKLOOP       ;BEVENT CLAMP DID NOT PREVENT INTERRUPTS
1712  007112  104542                  TRAP    T$ERCODE
1713  007114  000032                  .WORD   26
1714  007116  007212                  .WORD   BVERR2
1715  007120                  4$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
1716  007120  104006                  EMT     C$CLP1
1717  007122  005037  007142          CLR     ICOUNT                  ;CLEAR INTERRUPT COUNT
1718  007126                          ENDSUB
1719  007126                  L10044:
1720  007126  104003                  EMT     C$ESUB
1721  007130                          EXIT TST
1722  007130  104032                  EMT     C$EXIT
1723  007132  000326                  .WORD   L10042-.
1724  007134                  INTSR:
1725  007134                          BCNSRV  BEVENT                  ;INTERRUPT SERVICE ROUTINE
1726  007134                  BEVENT::
1727  007134  005237  007142          INC     ICOUNT                  ;INCREMENT COUNTER
1728  007140                          ENDSRV
1729  007140                  L10045:
1730  007140  000002                  RTI
1731
1732  007142  000000          ICOUNT: .WORD   0
1733
1734  007144                          BGNMSG  BVERR1
1735  007144                  BVERR1::
1736  007144                          PRINTB  #MSG1
1737  007144  012746  007260          MOV     #MSG1,-(SP)
1738  007150  012746  000001          MOV     #1,-(SP)
1739  007154  010600                  MOV     SP,R0
1740  007156  104014                  EMT     C$PNTB
1741  007160  062706  000004          ADD     #4,SP
1742  007164                          PRINTB  #INTCT,ICOUNT
1743  007164  013746  007142          MOV     ICOUNT,-(SP)
1744  007170  012746  007334          MOV     #INTCT,-(SP)
1745  007174  012746  000002          MOV     #2,-(SP)
1746  007200  010600                  MOV     SP,R0
1747  007202  104014                  EMT     C$PNTB
1748  007204  062706  000006          ADD     #6,SP
1749  007210                          ENDMSG
1750  007210                  L10046:
1751  007210  104023                  EMT     C$MSG
1752
1753  007212                          BGNMSG  BVERR2
1754  007212                  BVERR2::
1755  007212                          PRINTB  #MSG2
1756  007212  012746  007403          MOV     #MSG2,-(SP)
1757  007216  012746  000001          MOV     #1,-(SP)
1758  007222  010600                  MOV     SP,R0
1759  007224  104014                  EMT     C$PNTB
```

```
1760  007226  062706  000004                      ADD     #4,SP
1761  007232                                      PRINTB  #INTCT,ICOUNT
1762  007232  013746  007142                      MOV     ICOUNT,-(SP)
1763  007236  012746  007334                      MOV     #INTCT,-(SP)
1764  007242  012746  000002                      MOV     #2,-(SP)
1765  007246  010600                              MOV     SP,R0
1766  007250  104014                              EMT     C$PNTB
1767  007252  062706  000006                      ADD     #6,SP
1768  007256                                      ENDMSG
1769  007256                              L10047:
1770  007256  104023                              EMT     C$MSG
1771
1772  007260  040445  042502  042526  MSG1:     .ASCIZ  /%ABEVENT CLAMP FAILED TO ALLOW INTERRUPTS%N/
1773  007266  052116  041440  040514
1774  007274  050115  043040  044501
1775  007302  042514  020104  047524
1776  007310  040440  046114  053517
1777  007316  044440  052116  051105
1778  007324  052522  052120  022523
1779  007332  000116
1780  007334  040445  052516  041115  INTCT:   .ASCIZ  /%ANUMBER OF INTERRUPTS RECEIVED: %03%N/
1781  007342  051105  047440  020106
1782  007350  047111  042524  051122
1783  007356  050125  051524  051040
1784  007364  041505  044505  042526
1785  007372  035104  022440  031517
1786  007400  047045     000
1787  007403     045  041101  053105  MSG2:     .ASCIZ  /%ABEVENT CLAMP DID NOT PREVENT INTERRUPTS%N/
1788  007410  047105  020124  046103
1789  007416  046501  020120  044504
1790  007424  020104  047516  020124
1791  007432  051120  053105  047105
1792  007440  020124  047111  042524
1793  007446  051122  050125  051524
1794  007454  047045     000
1795          007460                              .EVEN
1796  007460                                      ENDTST
1797  007460                              .10042:
1798  007460  104001                              EMT     C$ETST
```

```
1799                                    .SBTTL  TEST 4: LIGHT DISPLAY TEST
1800                                    ;++
1801                                    ;TEST TO VERIFY THAT THE FOUR RED LED'S ARE WORKING AND CAN BE
1802                                    ;TURNED ON INDIVIDUALLY.
1803                                    ;--
1804
1805  007462                                    BGNTST
1806
1807  007462  005037  177524                   CLR     LSREG                   ;TURN ON ALL FOUR LED'S
1808  007466                                    WAITMS  #2.                     ;DELAY APPROX. 0.2 SEC.
1809  007466  012700  000002                   MOV     #2.,R0
1810  007472  104026                           EMT     C$WTM
1811  007474  012737  000017  177524           MOV     #17,LSREG               ;TURN OFF ALL FOUR LED'S
1812  007502                                    WAITMS  #2.                     ;DELAY APPROX. 0.2 SEC.
1813  007502  012700  000002                   MOV     #2.,R0
1814  007506  104026                           EMT     C$WTM
1815  007510                                    MANUAL                          ;IS MANUAL INTERVENTION ALLOWED?
1816  007510  104051                           EMT     C$MANI
1817  007512                                    BCOMPLETE       2$              ;BR IF YES
1818  007512  103410                           BCS     2$
1819  007514  022737  000030  002206           CMP     #30,PASCT               ;IS PASS COUNT >  30?
1820  007522  003402                           BLE     1$                      ;BR IF YES
1821  007524                                    EXIT    TST
1822  007524  104032                           EMT     C$EXIT
1823  007526  000072                           .WORD   L10050-.
1824  007530  005037  002206          1$:      CLR     PASCT                   ;EXIT TEST
1825  007534  012737  000016  177524  2$:      MOV     #16,LSREG               ;TURN ON THE LED CORRESPONDING TO THE LSB
1826  007542                                    WAITMS  #2.                     ;DELAY APPROX. 0.2 SEC.
1827  007542  012700  000002                   MOV     #2.,R0
1828  007546  104026                           EMT     C$WTM
1829  007550  012737  000015  177524           MOV     #15,LSREG               ;TURN ON 2ND LED
1830  007556                                    WAITMS  #2.                     ;DELAY APPROX. 0.2 SEC.
1831  007556  012700  000002                   MOV     #2.,R0
1832  007562  104026                           EMT     C$WTM
1833  007564  012737  000013  177524           MOV     #13,LSREG               ;TURN ON 3RD LED
1834  007572                                    WAITMS  #2.                     ;DELAY APPROX. 0.2 SEC.
1835  007572  012700  000002                   MOV     #2.,R0
1836  007576  104026                           EMT     C$WTM
1837  007600  012737  000007  177524           MOV     #7,LSREG                ;TURN ON LED CORRESPONDING TO MSB
1838  007606                                    WAITMS  #2.                     ;DELAY APPROX. 0.2 SEC.
1839  007606  012700  000002                   MOV     #2.,R0
1840  007612  104026                           EMT     C$WTM
1841  007614                                    EXIT    TST                     ;EXIT
1842  007614  104032                           EMT     C$EXIT
1843  007616  000002                           .WORD   L10050-.
1844
1845  007620                                    ENDTST
1846  007620                          L10050:
1847  007620  104001                           EMT     $ETST
1848
```

```
1849                                    .SBTTL  TEST 5: ROCKER SWITCHES TEST
1850                                    ;TEST TO CONFIRM THE ROCKER SWITCH SETTINGS. THIS TEST ASSUMES THAT,
1851                                    ;IN MANUFACTURING, THE ROCKER SWITCHES ARE ALL IN THE ON POSITION.
1852                                    ;THIS INCLUDES BOTH E21 AND E15.IN MANUFACTURING, THIS TEST WILL
1853                                    ;VERIFY THAT ALL SWITCHES CAN BE READ AS ON. IN OTHER ENVIRONMENTS,
1854                                    ;THE OPERATOR MAY SPECIFY WHAT THE SWITCH SETTINGS ARE BEFORE
1855                                    ;THE DIAGNOSTIC IS STARTED (SEE PROGRAM OPTIONS UNDER OPERATING
1856                                    ;INSTRUCTIONS). SWITCHES A1-A8 CORRESPOND TO E15 AND SWITCHES
1857                                    ;B1-B4 TO E21.
1858  007622                                    BGNTST
1859
1860  007622                                    MANUAL                          ;IS MANUAL INTERVENTION ALLOWED?
1861  007622  104051                            EMT     C$MANI
1862  007624                                    BCOMPLETE       PRTSW           ;BR IF YES
1863  007624  103412                            BCS     PRTSW
1864  007626  023737  002216  177524            CMP     SWSET,LSREG             ;ALL SWITCHES SHOULD BE ON AND BITS 0-11 SET
1865  007634  001403                            BEQ     1$                      ;BR IF SWITCH READINGS ARE OK
1866  007636                                    ERRDF   27,,SWERR               ;CANNOT READ SWITCHES PROPERLY
1867  007636  104442                            TRAP    T$ERCODE
1868  007640  000033                            .WORD   27
1869  007642  010144                            .WORD   SWERR
1870  007644                            1$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
1871  007644  104006                            EMT     C$CLP1
1872  007646                                    EXIT    TST                     ;EXIT
1873  007646  104032                            EMT     C$EXIT
1874  007650  000524                            .WORD   L10051-.
1875  007652  013737  177524  010140  PRTSW:    MOV     LSREG,TEMP              ;COPY CONTENTS OF LSREG
1876  007660  005037  010142                    CLR     SWCHON                  ;CLEAR MASK
1877  007664  012737  000014  010136            MOV     #14,SWCNT               ;SET SWITCH COUNT
1878  007672  032737  000001  010140  LP:       BIT     #BIT0,TEMP              ;TEST FOR SWITCH SET
1879  007700  001403                            BEQ     2$                      ;BR IF NOT SET
1880  007702  052737  100000  010142            BIS     #BIT15,SWCHON           ;IF SET, THEN SET CORRESPNDING BIT IN MASK
1881  007710  000241                    2$:     CLC                             ;CLEAR C-BIT FOR ROTATE
1882  007712  006037  010142                    ROR     SWCHON                  ;ROTATE SWSET
1883  007716  006037  010140                    ROR     TEMP                    ;GET READY TO TEST NEXT SWITCH
1884  007722  005337  010136                    DEC     SWCNT                   ;DECREMENT SWITCH COUNT
1885  007726  001361                            BNE     LP                      ;LOOP UNTIL ALL SWITCHES HAVE BEEN CHECKED
1886  007730  000241                            CLC                             ;CLEAR C-BIT FOR ROTATE
1887  007732  006037  010142                    ROR     SWCHON                  ;ROTATE DATA
1888  007736  006037  010142                    ROR     SWCHON                  ;ROTATE DATA
1889  007742  006037  010142                    ROR     SWCHON                  ;ROTATE DATA
1890  007746                                    PRINTF  #READN,SWCHON           ;PRINT SWITCH SETTINGS
1891  007746  013746  010142                    MOV     SWCHON,-(SP)
1892  007752  012746  010176                    MOV     #READN,-(SP)
1893  007756  012746  000002                    MOV     #2,-(SP)
1894  007762  010600                            MOV     SP,R0
1895  007764  104017                            EMT     C$PNTF
1896  007766  062706  000006                    ADD     #6,SP
1897
1898  007772  013702  010142                    MOV     SWCHON,R2               ;COPY SWITCH SETTINGS
1899  007776  012701  000001                    MOV     #1,R1                   ;SET SWITCH NUMBER
1900  010002  032702  000001            TAG:    BIT     #BIT0,R2                ;IS THIS SWITCH ON?
1901  010006  001411                            BEQ     TAG2                    ;BR IF NO
1902  010010                                    PRINTF  #MESSG1,R1              ;PRINT SWITCH NUMBER
1903  010010  010146                            MOV     R1,-(SP)
1904  010012  012746  010227                    MOV     #MESSG1,-(SP
```

```
1905  010016  012746  000002          MOV     #2,-(SP)
1906  010022  010600                  MOV     SP,R0
1907  010024  104017                  EMT     C$PNTF
1908  010026  062706  000006          ADD     #6,SP
1909  010032  005201          TAG2:   INC     R1              ;INCREMENT SWITCH NUMBER
1910  010034  006002                  ROR     R2              ;ROTATE SWITCH REGISTER
1911  010036  022701  000010          CMP     #10,R1          ;FINISHED WITH E15?
1912  010042  002357                  BGE     TAG1            ;BR IF NO
1913  010044  012701  000001          MOV     #1,R1           ;RESET SWITCH NUMBER FOR E21
1914  010050  032702  000001  TAG3:   BIT     #BIT0,R2        ;IS THIS SWITCH SET?
1915  010054  001411                  BEQ     TAG4            ;BR IF NO
1916  010056                          PRINTF  #MESSG2,R1      ;PRINT SWITCH NUMBER
1917  010056  010146                  MOV     R1,-(SP)
1918  010060  012746  010242          MOV     #MESSG2,-(SP)
1919  010064  012746  000002          MOV     #2,-(SP)
1920  010070  010600                  MOV     SP,R0
1921  010072  104017                  EMT     C$PNTF
1922  010074  062706  000006          ADD     #6,SP
1923  010100  005201          TAG4:   INC     R1              ;INCREMENT SWITCH NUMBER
1924  010102  006002                  ROR     R2              ;ROTATE SWITCH REGISTER
1925  010104  022701  000004          CMP     #4,R1           ;FINISHED?
1926  010110  002357                  BGE     TAG3            ;BR IF NO
1927  010112                          PRINTF  #NEWLIN
1928  010112  012746  010255          MOV     #NEWLIN,-(SP)
1929  010116  012746  000001          MOV     #1,-(SP)
1930  010122  010600                  MOV     SP,R0
1931  010124  104017                  EMT     C$PNTF
1932  010126  062706  000004          ADD     #4,SP
1933
1934  010132                          EXIT TST
1935  010132  104032                  EMT     C$EXIT
1936  010134  000240                  .WORD   L10051-.
1937
1938  010136  000000          SWCNT:  .WORD   0
1939  010140  000000          TEMP:   .WORD   0
1940  010142  000000          SWCHON: .WORD   0
1941
1942  010144                          BGNMSG  SWERR
1943  010144                  SWERR::
1944  010144                          PRINTB  #SERR1,SWSET,LSREG
1945  010144  013746  177524          MOV     LSREG,-(SP)
1946  010150  013746  002216          MOV     SWSET,-(SP)
1947  010154  012746  010260          MOV     #SERR1,-(SP)
1948  010160  012746  000003          MOV     #3,-(SP)
1949  010164  010600                  MOV     SP,R0
1950  010166  104014                  EMT     C$PNTB
1951  010170  062706  000010          ADD     #10,SP
1952  010174                          ENDMSG
1953  010174                  L10052:
1954  010174  104023                  EMT     C$MSG
1955
1956  010176  040445  053523  052111  READN:  .ASCII  /%ASWITCHES ON : %O/<0A>
1957  010204  044103  051505  047440
1958  010212  020116  020072  047445
1959  010220  022466  020101  022000
1960  010226          000
```

```
010227     045 040501 042045  MESSG1: .ASCIZ  /%AA%D1%A, /
010234  022461 026101 000040
010242  040445 022502 030504  MESSG2: .ASCIZ  /%AB%D1%A, /
010250  040445 020054    000
010255     045 000116         NEWLIN: .ASCIZ  /%N/
010260  040445 044504 020104  SERR1:  .ASCII  /%ADID NOT RECOGNIZE ALL SWITCHES AS ON%N/
010266  047516 020124 042522
010274  047503 047107 055111
010302  020105 046101 020114
010310  053523 052111 044103
010316  051505 040440 020123
010324  047117 047045
010330  040445 054105 042520          .ASCIZ  /%AEXPECTED: %O6%S5%ARECEIVED:%O6%N/
010336  052103 042105 020072
010344  047445 022466 032523
010352  040445 042522 042503
010360  05311[illegible] 042105 0[illegible]
010366  033[illegible]17 047045 [illegible]
        010374                        .EVEN
010374                                ENDT[illegible]
010374                   [illegible]:
010374  [illegible]                   EM[illegible]   [illegible]
```

```
                                        .SBTTL  TEST 6: 2K DIAGNOSTIC ROM
                                        ;++
                                        ;TEST TO PERFORM CHECKSUM AND CHECKWORD VERIFICATION ON THE 2K
                                        ;OF DIAGNOSTIC ROM. IN UNATTENDED MODE, THE ROM WILL BE ADDRESSED
                                        ;FROM 0-2K. IN STAND-ALONE MODE, THE OPERATOR MAY CHANGE THE
                                        ;ADDRESS BY RESPONDING TO QUESTIONS GENERATED ON THE FIRST PASS.
                                        ;--
010376                                          BGNTST

010376                                          BGNSUB
010376  104002                                  EMT     C$BSUB
010400                                          MANUAL                          ;MANUAL INTERVENTION OK?
010400  104051                                  EMT     C$MANI
010402                                          BNCOMPLETE      STRT            ;BR IF NO
010402  103014                                  BCC     STRT
010404  005737  002204                          TST     PASS                    ;FIRST PASS?
010410  001032                                  BNE     RSTRT                   ;BR IF NO
010412                                          GMANIL  DADDR,RSET,1,YES
010412  104043                                  EMT     C$GMAN
010414  000404                                  BR      10000$
010416  002232                                  .WORD   RSET
010420  000130                                  .WORD   T$CODE
010422  011503                                  .WORD   DADDR
010424  000001                                  .WORD   1
010426                                  10000$:
010426  005737  002232                          TST     RSET                    ;STANDARD JUMPERS?
010432  001404                                  BEQ     GETAD                   ;BR IF NO
010434  012737  000400  010756  STRT:   MOV     #400,DRLP               ;STORE STARTING ADDRESS
010442  000415                                  BR      RSTRT                   ;GO PERFORM TEST
010444                          GETAD:  GMANID  LOADR,STORE,D,-1,0,24,NO
010444  104043                                  EMT     C$GMAN
010446  000406                                  BR      10001$
010450  002220                                  .WORD   STORE
010452  000042                                  .WORD   T$CODE
010454  003004                                  .WORD   LOADR
010456  177777                                  .WORD   -1
010460  000000                                  .WORD   T$LOLIM
010462  000024                                  .WORD   T$HILIM
010464                                  10001$:
010464  004737  004742                          JSR     PC,SETADR               ;GET STARTING ADDRESS
010470  013737  002170  010756                  MOV     LOPAG,DRLP              ;STORE STARTING ADDRESS
010476  013737  010756  177520  RSTRT:  MOV     DRLP,PCR                ;SET UP PCR
010504  012737  000010  002172  DRTST:  MOV     #10,COUNTR              ;SET NUMBER OF CHECKWORDS TO CHECK
010512  012705  002144                          MOV     #SFPTBL,R5              ;LOCATION OF CHECKWORDS
010516  012737  000001  002176                  MOV     #1,RFLAG                ;INDICATE ROM
010524  005037  002164                  DLOOP:  CLR     BCF                     ;SIGNAL LOW BYTES ARE BEING CHECKED
010530  122737  177777  173774                  CMPB    #-1,@#173774            ;DOES THE ROM EXIST?
010536  001005                                  BNE     1$                      ;BR IF YES
010540                                          ERRDF   30,,DERR1,CK,KK         ;DIAGNOSTIC ROM E48 NOT FOUND
010540  104542                                  TRAP    T$ERCODE
010542  000036                                  .WORD   30
010544  010760                                  .WORD   DERR1
010546                                          EXIT    TST                     ;EXIT TEST,ROM NOT FOUND
010546  104032                                  EMT     C$EXIT
010550  000754                                  .WORD   L10???-.
010552                                  1$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
```

```
2040  010552  104006                          EMT     C$CLP1
2041  010554  004737  004132                  JSR     PC,CHKSUM               ;COMPUTE THE ACTUAL CHECKSUM
2042  010560  113737  173776  002200          MOVB    @#173776,EXPSUM         ;GET THE STORED CHECKSUM
2043  010566  063737  002202  002200          ADD     ACTSUM,EXPSUM           ;ADD THE EXPECTED AND ACTUAL CHECKSUMS
2044  010574  105737  002200                  TSTB    EXPSUM                  ;BYTE RESULT - 0?
2045  010600  001403                          BEQ     2$                      ;BR IF YES
2046  010602                                  ERRDF   31,,DERR2,CKLOOP        ;CHECKSUM ERROR IN DIAGNOSTIC ROM
2047  010602  104542                          TRAP    T$ERCODE
2048  010604  000037                          .WORD   31
2049  010606  011006                          .WORD   DERR2
2050  010610                          2$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
2051  010610  104006                          EMT     C$CLP1
2052  010612                                  ENDSUB
2053  010612                          L10054:
2054  010612  104003                          EMT     C$ESUB
2055
2056
2057  010614                                  BGNSUB
2058  010614  104002                          EMT     C$BSUB
2059  010616  012737  000001  002164          MOV     #1,BCF                  ;SET BCF TO DENOTE HIGH BYTES
2060  010624  122737  177777  173775          CMPB    #-1,@#173775            ;DOES THE ROM EXIST?
2061  010632  001005                          BNE     3$                      ;BR IF YES
2062  010634                                  ERRDF   32,,DERR3,CKLOOP        ;DIAGNOSTIC ROM E53 NOT FOUND
2063  010634  104542                          TRAP    T$ERCODE
2064  010636  000040                          .WORD   32
2065  010640  011034                          .WORD   DERR3
2066  010642                                  EXIT    TST                     ;EXIT TEST, ROM NOT FOUND
2067  010642  104032                          EMT     C$EXIT
2068  010644  000660                          .WORD   L10053-.
2069  010646                          3$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
2070  010646  104006                          EMT     C$CLP1
2071  010650  004737  004132                  JSR     PC,CHKSUM               ;COMPUTE THE ACTUAL CHECKSUM
2072  010654  113737  173777  002200          MOVB    @#173777,EXPSUM         ;GET EXPECTED CHECKSUM
2073  010662  063737  002202  002200          ADD     ACTSUM,EXPSUM           ;ADD THE EXPECTED AND ACTUAL CHECKSUMS
2074  010670  105737  002200                  TSTB    EXPSUM                  ;BYTE RESULT = 0?
2075  010674  001403                          BEQ     4$                      ;BR IF YES
2076  010676                                  ERRDF   33,,DERR4,CKLOOP        ;CHECKSUM ERROR IN DIAGNOSTIC ROM
2077  010676  104542                          TRAP    T$ERCODE
2078  010700  000041                          .WORD   33
2079  010702  011062                          .WORD   DERR4
2080  010704                          4$:     CKLOOP
2081  010704  104006                          EMT     C$CLP1
2082  010706                                  ENDSUB
2083  010706                          L10055:
2084  010706  104003                          EMT     C$ESUB
2085
2086  010710                                  BGNSUB
2087  010710  104002                          EMT     C$BSUB
2088  010712  022537  173776                  CMP     (R5)+,@#173776          ;VERIFY THE CHECKWORD FOR THIS PAGE
2089  010716  001403                          BEQ     5$                      ;BR IF THE SAME
2090  010720                                  ERRDF   34,,DERR5,CKLOOP        ;CHECKWORD ERROR
2091  010720  104542                          TRAP    T$ERCODE
2092  010722  000042                          .WORD   34
2093  010724  011110                          .WORD   DERR5
2094  010726                          5$:     CKLOOP
2095  010726  104006                          EMT     C$CLP1
```

```
2096  010730                                    ENDSUB
2097  010730                              L10056:
2098  010730  104003                             EMT     C$ESUB
2099
2100
2101  010732                                    BGNSUB
2102  010732  104002                             EMT     C$BSUB
2103  010734  062737  001002  177520             ADD     #1002,PCR       ;NEXT PAGE IN PCR
2104  010742  005337  002172                     DEC     COUNTR          ;DECREMENT CHECKWORD COUNT
2105  010746  001266                             BNE     DLOOP           ;LOOP UNTIL ALL 20 PAGES HAVE BEEN CHECKED
2106  010750                                    ENDSUB
2107  010750                              L10057:
2108  010750  104003                             EMT     C$ESUB
2109
2110  010752                                    EXIT    TST
2111  010752  104032                             EMT     C$EXIT
2112  010754  000550                             .WORD    10053-.
2113
2114  010756  000000                             DRLP:   .WORD   0
2115
2116  010760                              BGNMSG  DERR1
2117  010760                              DERR1::
2118  010760                              PRINTB  #LRAERR,#NODR
2119  010760  012746  011457                     MOV     #NODR,-(SP)
2120  010764  012746  011136                     MOV     #LRAERR,-(SP)
2121  010770  012746  000002                     MOV     #2,-(SP)
2122  010774  010600                             MOV     SP,R0
2123  010776  104014                             EMT     C$PNTB
2124  011000  062706  000006                     ADD     #6,SP
2125  011004                              ENDMSG
2126  011004                              L10060:
2127  011004  104023                             EMT     C$MSG
2128
2129  011006                              BGNMSG  DERR2
2130  011006                              DERR2::
2131  011006                              PRINTB  #LOWROM,#CKERR
2132  011006  012746  002634                     MOV     #CKERR,-(SP)
2133  011012  012746  011212                     MOV     #LOWROM,-(SP)
2134  011016  012746  000002                     MOV     #2,-(SP)
2135  011022  010600                             MOV     SP,R0
2136  011024  104014                             EMT     C$PNTB
2137  011026  062706  000006                     ADD     #6,SP
2138  011032                              ENDMSG
2139  011032                              L10061:
2140  011032  104023                             EMT     C$MSG
2141
2142  011034                              BGNMSG  DERR3
2143  011034                              DERR3::
2144  011034                              PRINTB  #HRAERR,#NODR
2145  011034  012746  011457                     MOV     #NODR,-(SP)
2146  011040  012746  011261                     MOV     #HRAERR,-(SP)
2147  011044  012746  000002                     MOV     #2,-(SP)
2148  011050  010600                             MOV     SP,R0
2149  011052  104014                             EMT     C$PNTB
2150  011054  062706  000006                     ADD     #6,SP
2151  011060                              ENDMSG
```

```
2152  011060                          L10062:
2153  011060  104023                         EMT     C$MSG
2154
2155  011062                          BGNMSG  DERR4
2156  011062                          DERR4::
2157  011062                          PRINTB  #HIROM,#CKERR
2158  011062  012746  002634                MOV     #CKERR,-(SP)
2159  011066  012746  011335                MOV     #HIROM,-(SP)
2160  011072  012746  000002                MOV     #2,-(SP)
2161  011076  010600                         MOV     SP,R0
2162  011100  104014                         EMT     C$PNTB
2163  011102  062706  000006                ADD     #6,SP
2164  011106                          ENDMSG
2165  011106                          L10063:
2166  011106  104023                         EMT     C$MSG
2167
2168  011110                          BGNMSG  DERR5
2169  011110                          DERR5::
2170  011110                          PRINTB  #MISTAK
2171  011110  012746  011405                MOV     #MISTAK,-(SP)
2172  011114  012746  000001                MOV     #1,-(SP)
2173  011120  010600                         MOV     SP,R0
2174  011122  104014                         EMT     C$PNTB
2175  011124  062706  000004                ADD     #4,SP
2176  011130  004737  004356          JSR    PC,VIRTAD
2177  011134                          ENDMSG
2178  011134                          L10064:
2179  011134  104023                         EMT     C$MSG
2180
2181  011136  052045  047045  040445  LRAERR: .ASCIZ  /%T%N%ACANNOT ACCESS DIAGNOSTIC ROM IN E48%N/
2182  011144  040503  047116  052117
2183  011152  040440  041503  051505
2184  011160  020123  044504  043501
2185  011166  047516  052123  041511
2186  011174  051040  046517  044440
2187  011202  020116  032105  022470
2188  011210  000116
2189
2190  011212  052045  047045  040445  LOWROM: .ASCIZ  /%T%N%ALOW BYTE DIAGNOSTIC ROM IN E48%N/
2191  011220  047514  020127  054502
2192  011226  042524  042040  040511
2193  011234  047107  051517  044524
2194  011242  020103  047522  020115
2195  011250  047111  042440  034064
2196  011256  047045     000
2197
2198  011261     045  022524  022516  HRAERR: .ASCIZ  /%T%N%ACANNOT ACCESS DIAGNOSTIC ROM IN E53%N/
2199  011266  041501  047101  047516
2200  011274  020124  041501  042503
2201  011302  051523  042040  040511
2202  011310  047107  051517  044524
2203  011316  020103  047522  020115
2204  011324  047111  042440  031465
2205  011332  047045     000
2206
2207  011335     045  022524  022516  HIROM:  .ASCIZ  /%T%N%AHIGH BYTE DIAGNOSTIC ROM IN E53%N/
```

```
 2208  011342  044101  043511  020110
 2209  011350  054502  042524  042040
 2210  011356  040511  047107  051517
 2211  011364  044524  020103  047522
 2212  011372  020115  047111  042440
 2213  011400  031465  047045     000
 2214
 2215  011405     045  044501  041516  MISTAK: .ASCIZ  /%AINCORRECT CHECKWORD IN DIAGNOSTIC ROM%N/
 2216  011412  051117  042522  052103
 2217  011420  041440  042510  045503
 2218  011426  047527  042122  044440
 2219  011434  020116  044504  043501
 2220  011442  047516  052123  041511
 2221  011450  051040  046517  047045
 2222  011456     000
 2223
 2224  011457     116  047117  042455  NXDR:   .ASCIZ  /NON-EXISTENT MEMORY/
 2225  011464  044530  052123  047105
 2226  011472  020124  042515  047515
 2227  011500  054522     000
 2228
 2229  011503     123  040524  042116  DADDR:  .ASCIZ  /STANDARD JUMPERS/
 2230  011510  051101  020104  052512
 2231  011516  050115  051105  000123
 2232
 2233                                          .EVEN
 2234  011524                                  ENDTST
 2235  011524                          ;10053:
 2236  011524  104001                         EMT     ;$ETST
```

```
                                .SBTTL  TEST 7: TEST ALL ADDITIONAL MEMORY
                                ;++
                                ;TEST TO LOCATE AND VERIFY CHECKSUMS IN ALL RESIDENT MEMORY
                                ;ON A PAGE BASIS. THERE ARE FOUR STORAGE AREAS ASSOCIATED
                                ;WITH THIS TEST WHICH HOLD THE CHECKWORDS OF ALL THE MEMORY
                                ;THAT IS TO BE TESTED. THESE TABLES WILL HAVE DEFAULT VALUES
                                ;ONLY IF THE ASSOCIATED MEMORY CHIP IS A STANDARD COMPONENT
                                ;ON THE BOARD. IF NO DEFAULT VALUES EXIST, THE OPERATOR MUST
                                ;INPUT THE CHECKWORDS AS LISTED ON THE PRINT SET. THE MEMORY
                                ;WILL BE TESTED IN THE FOLLOWING LOCATIONS BY DEFAULT:
                                ;
                                ;       EXPANDABLE DIAGNOSTIC ROM       2-4K
                                ;       EPROM IN SOCKETS                4-6K
                                ;       SYSTEM ROM                      16-32K
                                ;       SYSTEM EPROM                    16-24K
                                ;
                                ;THE TEST WILL FIRST VERIFY THE CHECKSUMS IN ALL RESIDENT ROM,
                                ;THEN COMPARE THE ACTUAL CHECKWORDS. ERROR INFORMATION WILL
                                ;INCLUDE THE SPECIFIC TYPE OF ERROR THAT OCCURRS, THE VIRTUAL
                                ;ADDRESS, AND WHETHER IT WAS THE HIGH BYTE OR LOW BYTE ROM/EPROM.
                                ;THIS INFORMATION SHOULD ALLOW A KNOWLEDGEABLE OPERATOR TO ISOLATE
                                ;THE ERROR DOWN TO A SINGLE ROM/EPROM WITH THE AID OF THE
                                ;ADDRESS MAP IN THE PRINT SET.
                                ;--
011526                                  BGNTST
011526                                  BGNSUB
011526  104002                          EMT     C$BSUB
011530                                  MANUAL                          ;UNDER APT?
011530  104051                          EMT     C$MANI
011532                                  BNCOMPLETE      DFLTST          ;SKIP TEST IF YES
011532  103112                          BCC     DFLTST
011534  005037  013540                  CLR     ADDON                   ;RESTORE DEFAULT
011540  005737  002204                  TST     PASS                    ;FIRST PASS?
011544  001422                          BEQ     GET                     ;BR IF YES
011546  005737  013544                  TST     LOD1                    ;EXPANDED DIAGNOSTIC ROM?
011552  001153                          BNE     LD1                     ;BR IF YES
011554  005737  013546                  TST     LOD2                    ;EPROM IN SOCKETS?
011560  001402                          BEQ     P1                      ;BR IF NO
011562  000137  012430                  JMP     LD2                     ;TEST EPROM
011566  005737  013550          P1:     TST     LOD3                    ;SYSTEM ROM ?
011572  001402                          BEQ     P2                      ;BR IF NO
011574  000137  012776                  JMP     LD3                     ;TEST ROM
011600  005737  013552          P2:     TST     LOD4                    ;SYSTEM EPROM?
011604  001465                          BEQ     DFLTST                  ;EXIT IF NO
011606  000137  013334                  JMP     LD4                     ;TEST EPROM
011612                          GET:    GMANIL  EXEC,ADDON,1,YES
011612  104043                          EMT     C$GMAN
011614  000404                          BR      10000$
011616  013540                          .WORD   ADDON
011620  000130                          .WORD   T$CODE
011622  014047                          .WORD   EXEC
011624  000001                          .WORD   1
011626                          10000$:
011626  005737  013540                  TST     ADDON                   ;ADDITIONAL MEMORY?
011632  001452                          BEQ     DFLTST                  ;BR IF NO
```

```
2293  011634                          DIAIN:  GMANIL  EXPND,RESPND,1,NO
2294  011634  104043                          EMT     C$GMAN
2295  011636  000404                          BR      10001$
2296  011640  002230                          .WORD   RESPND
2297  011642  000120                          .WORD   T$CODE
2298  011644  014076                          .WORD   EXPND
2299  011646  000001                          .WORD   1
2300  011650                          10001$:
2301  011650  005737  002230                  TST     RESPND                  ;EXPANDED DIAGNOSTIC ROM?
2302  011654  001045                          BNE     EXPROM                  ;BR IF YES
2303  011656                          EPRIN:  GMANIL  EPRM,RESPND,1,NO
2304  011656  104043                          EMT     C$GMAN
2305  011660  000404                          BR      10002$
2306  011662  002230                          .WORD   RESPND
2307  011664  000120                          .WORD   T$CODE
2308  011666  014126                          .WORD   EPRM
2309  011670  000001                          .WORD   1
2310  011672                          10002$:
2311  011672  005737  002230                  TST     RESPND                  ;EPROM IN SOCKETS?
2312  011676  001402                          BEQ     SYSRIN                  ;BR IF NO
2313  011700  000137  012316                  JMP     EPRMT                   ;JUMP TO ACCEPT INPUT
2314  011704                          SYSRIN: GMANIL  SYSR,RESPND,1,NO
2315  011704  104043                          EMT     C$GMAN
2316  011706  000404                          BR      10003$
2317  011710  002230                          .WORD   RESPND
2318  011712  000120                          .WORD   T$CODE
2319  011714  014147                          .WORD   SYSR
2320  011716  000001                          .WORD   1
2321  011720                          10003$:
2322  011720  005737  002230                  TST     RESPND                  ;SYSTEM ROM?
2323  011724  001402                          BEQ     SYSEIN                  ;BR IF NO
2324  011726  000137  012636                  JMP     SYSRT                   ;INPUT CHECKWORDS
2325  011732                          SYSEIN: GMANIL  SYSE,RESPND,1,NO
2326  011732  104043                          EMT     C$GMAN
2327  011734  000404                          BR      10004$
2328  011736  002230                          .WORD   RESPND
2329  011740  000120                          .WORD   T$CODE
2330  011742  014162                          .WORD   SYSE
2331  011744  000001                          .WORD   1
2332  011746                          10004$:
2333  011746  005737  002230                  TST     RESPND                  ;SYSTEM EPROM?
2334  011752  001402                          BEQ     DFLTST                  ;BR IF NO
2335  011754  000137  013174                  JMP     SYSET                   ;INPUT CHECKWORDS
2336  011760                          DFLTST: EXIT    TST                     ;NO ADDTL. MEMORY -- EXIT
2337  011760  104032                          EMT     C$EXIT
2338  011762  002344                          .WORD   L10065-.
2339  011764                                  ENDSUB
2340  011764                          L10066:
2341  011764  104003                          EMT     C$ESUB
2342
2343
2344  011766                                  BGNSUB
2345  011766  104002                          EMT     C$BSUB
2346  011770  005037  002242          EXPROM: CLR     ERRFLG                  ;CLEAR ERROR FLAG
2347  011774  012737  000010  002222          MOV     #10.,WORDCT             ;COUNT & CHECKWORDS
2348  012002  012702  002244                  MOV     #EXPDIA,R2              ;POINTER TO STORAGE TABLE
```

```
2349  012006  004737  004176                    JSR     PC,INPUT                ;INPUT CHECKWORDS
2350  012012                                    GMANIL  EXADD,ANSR,1,YES
2351  012012  104043                           EMT     C$GMAN
2352  012014  000404                           BR      10000$
2353  012016  002174                           .WORD   ANSR
2354  012020  000130                           .WORD   T$CODE
2355  012022  014177                           .WORD   EXADD
2356  012024  000001                           .WORD   1
2357  012026                            10000$:
2358  012026  005737  002174                    TST     ANSR                    ;STANDARD MEMORY RANGE?
2359  012032  001020                           BNE     1$                      ;BR IF YES
2360  012034  005237  002174                    INC     ANSR                    ;RESTORE DEFAULT VALUE
2361  012040                                    GMANID  LOADR,STORE,D,-1,0,30,NO
2362  012040  104043                           EMT     C$GMAN
2363  012042  000406                           BR      10001$
2364  012044  002220                           .WORD   STORE
2365  012046  000042                           .WORD   T$CODE
2366  012050  003004                           .WORD   LOADR
2367  012052  177777                           .WORD   -1
2368  012054  000000                           .WORD   T$LOLIM
2369  012056  000030                           .WORD   T$HILIM
2370  012060                            10001$:
2371  012060  004737  004742                    JSR     PC,SETADR               ;GET FIRST PAGE ADDRESS
2372  012064  013737  002170  013544            MOV     LOPAG,LOD1              ;STORE LOW PAGE NO.
2373  012072  000403                           BR      LD1                     ;SKIP NEXT INSTRUCTION
2374  012074  012737  010420  013544    1$:     MOV     #010420,LOD1            ;STANDARD PAGE = 20,21  2-4K RANGE
2375  012102  013737  013544  177520    LD1:    MOV     LOD1,PCR                ;LOAD STARTING PAGE
2376  012110  012737  000001  002176            MOV     #1,RFLAG                ;INDICATE ROM
2377  012116  012703  002244                    MOV     #EXPDIA,R3              ;POINTER TO CHECKWORDS
2378  012122  012737  000010  002172            MOV     #10,COUNTR              ;PAGE COUNT
2379  012130  012337  002226            EXPTST: MOV     (R3)+,CKWD              ;GET CHECKWORD FOR THIS PAGE
2380  012134  004737  004514                    JSR     PC,MEMTST               ;TEST MEMORY
2381  012140  005737  002166                    TST     REAL                    ;DOES THE MEMORY EXIST?
2382  012144  001455                           BEQ     E3                      ;BR IF NO
2383  012146  005737  002242                    TST     ERRFLG                  ;ANY OTHER ERRORS?
2384  012152  001421                           BEQ     NOERR                   ;BR IF NO
2385  012154  004737  004356                    JSR     PC,VIRTAD               ;GET ADDRESS OF ERROR
2386  012160  005737  002164                    TST     BCF                     ;LOW BYTE PAGE?
2387  012164  001004                           BNE     HIGH                    ;BR IF NO
2388  012166  012737  002677  002240            MOV     #LOBYT,BYTLOC           ;SET POINTER FOR ERROR MSG.
2389  012174  000403                           BR      DATOUT                  ;PRINT ERROR MESSAGE
2390  012176  012737  002741  002240    HIGH:   MOV     #HIBYT,BYTLOC           ;POINTER FOR ERROR MSG.
2391  012204  022737  000001  002242    DATOUT: CMP     #1,ERRFLG               ;CHECKSUM ERROR?
2392  012212  001420                           BEQ     E1                      ;BR IF YES
2393  012214  000424                           BR      E2                      ;ELSE CHECKWORD ERROR
2394  012216  062737  001002  177520    NOERR:  ADD     #1002,PCR               ;ADJUST PCR
2395  012224  005337  002172                    DEC     COUNTR                  ;DEC PAGE COUNT
2396  012230  001337                           BNE     EXPTST                  ;LOOP UNTIL ALL PAGES ARE TESTED
2397  012232  005737  002204            MORE :  TST     PASS                    ;FIRST PASS?
2398  012236  001002                           BNE     1$                      ;BR IF NO
2399  012240  000137  011656                    JMP     EPRIN                   ;TEST ANY ADDITIONAL MEMORY
2400  012244  000137  011566            1$:     JMP     P1                      ;FIND ANY ADDITIONAL MEMORY
2401  012250                                    EXIT    SUB                     ;END OF SUBTEST
2402  012250  104032                           EMT     C$EXIT
2403  012252  000040                           .WORD   L^^0067-.
2404  012254                            E^^:    ERRDF   35,EXPND,CKSME,CKLOOP
```

```
2405  012254  104562                          TRAP    T$ERCODE
2406  012256  000043                          .WORD   35
2407  012260  014076                          .WORD   EXPND
2408  012262  013554                          .WORD   CKSME
2409  012264  000762                          BR      MORE
2410  012266                          E2:     ERRDF   36,EXPND,CWKDE,CKLOOP
2411  012266  104562                          TRAP    T$ERCODE
2412  012270  000044                          .WORD   36
2413  012272  014076                          .WORD   EXPND
2414  012274  013612                          .WORD   CWKDE
2415  012276  000755                          BR      MORE
2416  012300                          E3:     ERRDF   37,EXPND,NONXT,CKLOOP
2417  012300  104562                          TRAP    T$ERCODE
2418  012302  000045                          .WORD   37
2419  012304  014076                          .WORD   EXPND
2420  012306  013644                          .WORD   NONXT
2421  012310  000750                          BR      MORE
2422  012312                                  ENDSUB
2423  012312                          L10067:
2424  012312  104003                          EMT     C$ESUB
2425
2426  012314                                  BGNSUB
2427  012314  104002                          EMT     C$BSUB
2428  012316  005037  002242          EPRMT:  CLR     ERRFLG                  ;CLEAR ERROR FLAG
2429  012322  012737  000010  002222        MOV     #10,WORDCT              ;INPUT 8 CHECKWORDS
2430  012330  012702  002264                MOV     #EPROM,R2               ;POINTER TO STORAGE TABLE
2431  012334  004737  004176                JSR     PC,INPUT                ;INPUT CHECKWORDS
2432  012340                                  GMANIL  EPADD,ANSR,',YES
2433  012340  104043                          EMT     C$GMAN
2434  012342  000404                          BR      10000$
2435  012344  002174                          .WORD   ANSR
2436  012346  000130                          .WORD   T$CODE
2437  012350  014225                          .WORD   EPADD
2438  012352  000001                          .WORD   1
2439  012354                          10000$:
2440  012354  005737  002174                TST     ANSR                    ;STANDARD MEMORY RANGE?
2441  012360  001020                          BNE     1$                      ;BR IF YES
2442  012362  005237  002174                INC     ANSR                    ;RESTORE DEFAULT
2443  012366                                  GMANID  LOADR,STORE,D,-',0,3C,NO
2444  012366  104043                          EMT     C$GMAN
2445  012370  000406                          BR      10001$
2446  012372  002220                          .WORD   STORE
2447  012374  000042                          .WORD   T$CODE
2448  012376  003004                          .WORD   LOADR
2449  012400  177777                          .WORD   -1
2450  012402  000000                          .WORD   T$LOLIM
2451  012404  000030                          .WORD   T$HILIM
2452  012406                          10001$:
2453  012406  004737  004742                JSR     PC,SETADR               ;GET FIRST PAGE ADDRESS
2454  012412  013737  002170  013546        MOV     LOPAG,LOD2              ;STORE LOW PAGE NO.
2455  012420  000403                          BR      LD2                     ;SKIP NEXT INSTRUCTION
2456  012422  012737  020440  013546  1$:     MOV     #020440,LOD2            ;STANDARD PAGE = 40,41  4-6K RANGE
2457  012430  013737  013546  177520  LD2:    MOV     LOD2,PCR                ;LOAD STARTING ADDRESS
2458  012436  005037  002176                CLR     RFLAG                   ;INDICATE EPROM
2459  012442  012703  002264                MOV     #EPROM,R3               ;POINT TO CHECKWORDS
2460  012446  012737  000010  002172        MOV     #10,COUNTR              ;PAGE COUNT
```

```
 2461  012454  012337  002226          EPRTST: MOV     (R3)+,CKWD              ;GET CHECKWORD FOR THIS PAGE
 2462  012460  004737  004514                  JSR     PC,MEMTST               ;TEST MEMORY
 2463  012464  005737  002166                  TST     REAL                    ;DOES THE MEMORY EXIST?
 2464  012470  001453                          BEQ     E6                      ;BR IF NO
 2465  012472  005737  002242                  TST     ERRFLG                  ;ANY OTHER ERRORS?
 2466  012476  001421                          BEQ     NONE                    ;BR IF NO
 2467  012500  004737  004356                  JSR     PC,VIRTAD               ;GET ADDRESS OF ERROR
 2468  012504  005737  002164                  TST     BCF                     ;LOW BYTE PAGE?
 2469  012510  001004                          BNE     HIADD                   ;BR IF NO
 2470  012512  012737  002677  002240          MOV     #LOBYT,BYTLOC           ;SET POINTER FOR ERROR MSG.
 2471  012520  000403                          BR      PRIOUT                  ;PRINT ERROR MESSAGE
 2472  012522  012737  002741  002240  HIADD:  MOV     #HIBYT,BYTLOC           ;POINTER FOR ERROR MSG.
 2473  012530  022737  000001  002242  PRIOUT: CMP     #1,ERRFLG               ;CHECKSUM ERROR?
 2474  012536  001416                          BEQ     E4                      ;BR IF YES
 2475  012540  000422                          BR      E5                      ;ELSE CHECKWORD ERROR
 2476  012542  062737  001002  177520  NONE:   ADD     #1002,PCR               ;ADJUST PAGE IN PCR
 2477  012550  005337  002172                  DEC     COUNTR                  ;DEC PAGE COUNT
 2478  012554  001337                          BNE     EPRTST                  ;LOOP UNTIL FINISHED
 2479  012556  005737  002204          ADDTL:  TST     PASS                    ;FIRST PASS?
 2480  012562  001002                          BNE     1$                      ;BR IF NO
 2481  012564  000137  011704                  JMP     SYSRIN                  ;TEST ANY ADDITIONAL MEMORY
 2482  012570  000137  011600          1$:     JMP     P2                      ;FIND ANY ADDITIONAL MEMORY
 2483  012574                          E4:     ERRDF   40,EPRM,CKSME,CKLOOP
 2484  012574  104562                          TRAP    T$ERCODE
 2485  012576  000050                          .WORD   40
 2486  012600  014126                          .WORD   EPRM
 2487  012602  013554                          .WORD   CKSME
 2488  012604  000764                          BR      ADDTL
 2489  012606                          E5:     ERRDF   41,EPRM,CWKDE,CKLOOP
 2490  012606  104562                          TRAP    T$ERCODE
 2491  012610  000051                          .WORD   41
 2492  012612  014126                          .WORD   EPRM
 2493  012614  013612                          .WORD   CWKDE
 2494  012616  000757                          BR      ADDTL
 2495  012620                          E6:     ERRDF   42,EPRM,NONXT,CKLOOP
 2496  012620  104562                          TRAP    T$ERCODE
 2497  012622  000052                          .WORD   42
 2498  012624  014126                          .WORD   EPRM
 2499  012626  013644                          .WORD   NONXT
 2500  012630  000752                          BR      ADDTL
 2501  012632                                  ENDSUB
 2502  012632                          L10070:
 2503  012632  104003                          EMT     C$ESUB
 2504
 2505  012634                                  BGNSUB
 2506  012634  104002                          EMT     C$BSUB
 2507  012636  005037  002242          SYSRT:  CLR     ERRFLG                  ;CLEAR ERROR FLAG
 2508  012642                                  GMANID  RWDCT,RESPND,D,-1,0,100,NO
 2509  012642  104043                          EMT     C$GMAN
 2510  012644  000406                          BR      10000$
 2511  012646  002230                          .WORD   RESPND
 2512  012650  000042                          .WORD   T$CODE
 2513  012652  014005                          .WORD   RWDCT
 2514  012654  177777                          .WORD   -1
 2515  012656  000010                          .WORD   10.TIM
 2516  012660  000100                          .WORD   100.TIM
```

```
2517  012662                                  10000$:
2518  012662  013737  002230  013542                  MOV     RESPND,PGCT             ;STORE PAGE COUNT
2519  012670  013737  002230  002222                  MOV     RESPND,WORDCT           ;COPY WORD COUNT
2520  012676  012702  002304                         MOV     #SYSROM,R2              ;POINTER TO STORAGE TABLE
2521  012702  004737  004176                         JSR     PC,INPUT                ;INPUT CHECKWORDS
2522  012706                                          GMANIL  SRR,ANSR,1,YES
2523  012706  104043                                 EMT     C$GMAN
2524  012710  000404                                 BR      10001$
2525  012712  002174                                 .WORD   ANSR
2526  012714  000130                                 .WORD   T$CODE
2527  012716  014244                                 .WORD   SRR
2528  012720  000001                                 .WORD   1
2529  012722                                  10001$:
2530  012722  005737  002174                         TST     ANSR                    ;STANDARD MEMORY RANGE?
2531  012726  001020                                 BNE     1$                      ;BR IF YES
2532  012730  005237  002174                         INC     ANSR                    ;RESTORE DEFAULT VALUE
2533  012734                                          GMANID  LOADR,STORE,D,-1,0,30,NO
2534  012734  104043                                 EMT     C$GMAN
2535  012736  000406                                 BR      10002$
2536  012740  002220                                 .WORD   STORE
2537  012742  000042                                 .WORD   T$CODE
2538  012744  003004                                 .WORD   LOADR
2539  012746  177777                                 .WORD   -1
2540  012750  000000                                 .WORD   T$LOLIM
2541  012752  000030                                 .WORD   T$HILIM
2542  012754                                  10002$:
2543  012754  004737  004742                         JSR     PC,SETADR               ;GET FIRST PAGE ADDRESS
2544  012760  013737  002170  013550                  MOV     LOPAG,LOD3              ;STORE LOW PAGE NO.
2545  012766  000403                                 BR      LD3                     ;SKIP NEXT INSTRUCTION
2546  012770  012737  100600  013550  1$:     MOV     #100600,LOD3            ;STANDARD PAGE = 200,201  16-32K RANGE
2547  012776  013737  013550  177520  LD3:    MOV     LOD3,PCR                ;LOAD STARTING ADDRESS
2548  013004  012737  000001  002176                 MOV     #1,RFLAG                ;INDICATE ROM
2549  013012  012703  002304                         MOV     #SYSROM,R3              ;POINT TO CHECKWORDS
2550  013016  013737  013542  002172                 MOV     PGCT,COUNTR             ;PAGE COUNT
2551  013024  012337  002226          SYRTST: MOV     (R3)+,CKWD              ;GET CHECKWORD FOR THIS PAGE
2552  013030  004737  004514                         JSR     PC,MEMTST               ;TEST MEMORY
2553  013034  005737  002166                         TST     REAL                    ;DOES THE MEMORY EXIST?
2554  013040  001446                                 BEQ     E11                     ;BR IF NO
2555  013042  005737  002242                         TST     ERRFLG                  ;ANY OTHER ERRORS?
2556  013046  001421                                 BEQ     PASSED                  ;BR IF NO
2557  013050  004737  004356                         JSR     PC,VIRTAD               ;GET ADDRESS OF ERROR
2558  013054  005737  002164                         TST     BCF                     ;LOW BYTE PAGE?
2559  013060  001004                                 BNE     HIGHB                   ;BR IF NO
2560  013062  012737  002677  002240                 MOV     #LOBYT,BYTLOC           ;SET POINTER FOR ERROR MSG.
2561  013070  000403                                 BR      MSGOUT                  ;PRINT ERROR MESSAGE
2562  013072  012737  002741  002240  HIGHB:  MOV     #HIBYT,BYTLOC           ;POINTER FOR ERROR MSG.
2563  013100  022737  000001  002242  MSGOUT: CMP     #1,ERRFLG               ;CHECKSUM ERROR?
2564  013106  001411                                 BEQ     E7                      ;BR IF YES
2565  013110  000415                                 BR      E10                     ;ELSE CHECKWORD ERROR
2566  013112  062737  001002  177520  PASSED: ADD     #1002,PCR               ;ADJUST PAGE IN PCR
2567  013120  005337  002172                         DEC     COUNTR                  ;DEC PAGE COUNT
2568  013124  001337                                 BNE     SYRTST                  ;LOOP UNTIL FINISHED
2569  013126                                  [illegible]:    EXIT    TST             ;TEST IS FINISHED
2570  013126  10403[illegible]                        EMT     C$EXIT
2571  013130  00[illegible]                           .WORD   L[illegible]065-.
2572  [illegible]                             [illegible]:    ERRDF   43,SYSR[illegible]
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```
2573  013132  104562                          TRAP    T$ERCODE
2574  013134  000053                          .WORD   43
2575  013136  014147                          .WORD   SYSR
2576  013140  013554                          .WORD   CKSME
2577  013142  000771                          BR      NEXT
2578  013144                          E10:    ERRDF   44,SYSR,CWKDE,CKLOOP
2579  013144  104562                          TRAP    T$ERCODE
2580  013146  000054                          .WORD   44
2581  013150  014147                          .WORD   SYSR
2582  013152  013612                          .WORD   CWKDE
2583  013154  000764                          BR      NEXT
2584  013156                          E11:    ERRDF   45,SYSR,NONXT,CKLOOP
2585  013156  104562                          TRAP    T$ERCODE
2586  013160  000055                          .WORD   45
2587  013162  014147                          .WORD   SYSR
2588  013164  013644                          .WORD   NONXT
2589  013166  000757                          BR      NEXT
2590  013170                                  ENDSUB
2591  013170                          [illegible]:
2592  013170  104003                          EMT     C$ESUB
2593
2594  013172                                  BGNSUB
2595  013172  104002                          EMT     C$BSUB
2596  013174  005037  002224          [illegible]:  CLR     ERRFLG                  ;CLEAR ERROR FLAG
2597  013200                                  GMANID  RWDCT,RESPND,0,-1,10,40,NO
2598  013200  104043                          EMT     C$GMAN
2599  013202  000406                          BR      10000$
2600  013204  002230                          .WORD   RESPND
2601  013206  000042                          .WORD   T$CODE
2602  013210  014005                          .WORD   RWDCT
2603  013212  177777                          .WORD   -1
2604  013214  000010                          .WORD   T$LOLIM
2605  013216  000040                          .WORD   T$HILIM
2606  013220                          10000$:
2607  013220  013737  002230  013542          MOV     RESPND,PGCT             ;STORE PAGE COUNT
2608  013226  013737  002230  002222          MOV     RESPND,WORDCT           ;COPY WORD COUNT
2609  013234  012702  002304                  MOV     #SYSROM,R2              ;POINTER TO STORAGE TABLE
2610  013240  004737  004176                  JSR     PC,INPUT                ;INPUT CHECKWORDS
2611  013244                                  GMANIL  SYEE,ANSR,1,YES
2612  013244  104043                          EMT     C$GMAN
2613  013246  000404                          BR      10001$
2614  013250  002174                          .WORD   ANSR
2615  013252  000130                          .WORD   T$CODE
2616  013254  014274                          .WORD   SYEE
2617  013256  000001                          .WORD   1
2618  013260                          10001$
2619  013260  005737  002174                  TST     ANSR                    ;STANDARD MEMORY RANGE
2620  013264  001020                          BNE     1$                      ;BR IF YES
2621  013266  005237  002174                  INC     ANSR                    ;RESTORE DEFAULT VALUE
2622  013272                                  GMANID  LOADR,STORE,0,-1,10,30,NO
2623  013272  104043                          EMT     C$GMAN
2624  013274  000406                          BR      10002$
2625  013276  002220                          .WORD   STORE
2626  013300  000042                          .WORD   T$CODE
2627  013302  003004                          .WORD   LOADR
2628  013304  177777                          .WORD   -1
```

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2629  013306  000000                          .WORD   T$LOLIM
2630  013310  000030                          .WORD   T$HILIM
2631  013312                          10002$:
2632  013312  004737  004742                  JSR     PC,SETADR       ;GET FIRST PAGE ADDRESS
2633  013316  013737  002170  013552          MOV     LOPAG,LOD4      ;STORE LOW PAGE NO.
2634  013324  000403                          BR      LD4             ;SKIP NEXT INSTRUCTION
2635  013326  012737  100600  013552  1$:     MOV     #100600,LOD4    ;STANDARD PAGE = 200,201  16-24K RANGE
2636  013334  013737  013552  177520  LD4:    MOV     LOD4,PCR        ;LOAD STARTING ADDRESS
2637  013342  005037  002176                  CLR     RFLAG           ;INDICATE EPROM
2638  013346  012703  002304                  MOV     #SYSROM,R3      ;POINT TO CHECKWORDS
2639  013352  013737  013542  002172          MOV     PGCT,COUNTR     ;PAGE COUNT
2640  013360  012337  002226          SYETST: MOV     (R3)+,CKWD      ;GET CHECKWORD FOR THIS PAGE
2641  013364  004737  004514                  JSR     PC,MEMTST       ;TEST MEMORY
2642  013370  005737  002166                  TST     REAL            ;DOES THIS MEMORY EXIST?
2643  013374  001450                          BEQ     E14             ;BR IF NO
2644  013376  005737  002242                  TST     ERRFLG          ;ANY ERRORS?
2645  013402  001421                          BEQ     CONT            ;BR IF NO
2646  013404  004737  004356                  JSR     PC,VIRTAD       ;GET ADDRESS OF ERROR
2647  013410  005737  002164                  TST     BCF             ;LOW BYTE PAGE?
2648  013414  001004                          BNE     HBYTE           ;BR IF NO
2649  013416  012737  002677  002240          MOV     #LOBYT,BYTLOC   ;SET POINTER FOR ERROR MSG.
2650  013424  000403                          BR      PRIN            ;PRINT ERROR MESSAGE
2651  013426  012737  002741  002240  HBYTE:  MOV     #HIBYT,BYTLOC   ;POINTER FOR ERROR MSG.
2652  013434  022737  000001  002242  PRIN:   CMP     #1,ERRFLG       ;CHECKSUM ERROR?
2653  013442  001411                          BEQ     E12             ;BR IF YES
2654  013444  000416                          BR      E13             ;ELSE CHECKWORD ERROR
2655  013446  062737  001002  177520  CONT:   ADD     #1002,PCR       ;ADJUST PAGE IN PCR
2656  013454  005337  002172                  DEC     COUNTR          ;DEC PAGE COUNT
2657  013460  001337                          BNE     SYETST          ;LOOP UNTIL FINISHED
2658  013462                                  EXIT    TST             ;TEST IS FINISHED
2659  013462  104032                          EMT     C$EXIT
2660  013464  000642                          .WORD   L10065-.
2661  013466                          E12:    ERRDF   46,SYSE,CKSME,CKLOOP
2662  013466  104562                          TRAP    T$ERCODE
2663  013470  000056                          .WORD   46
2664  013472  014162                          .WORD   SYSE
2665  013474  013554                          .WORD   CKSME
2666  013476                                  EXIT    TST
2667  013476  104032                          EMT     C$EXIT
2668  013500  000626                          .WORD   L10065-.
2669  013502                          E13:    ERRDF   47,SYSE,CWKDE,CKLOOP
2670  013502  104562                          TRAP    T$ERCODE
2671  013504  000057                          .WORD   47
2672  013506  014162                          .WORD   SYSE
2673  013510  013612                          .WORD   CWKDE
2674  013512                                  EXIT    TST
2675  013512  104032                          EMT     C$EXIT
2676  013514  000612                          .WORD   L10065-.
2677  013516                          E14:    ERRDF   50,SYSE,NONXT,CKLOOP
2678  013516  104562                          TRAP    T$ERCODE
2679  013520  000062                          .WORD   50
2680  013522  014162                          .WORD   SYSE
2681  013524  013644                          .WORD   NONXT
2682  013526                                  EXIT    TST
2683  013526  104032                          EMT     C$EXIT
2684  013530  000576                          .WORD   L10065-.
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2685  013532                                  ENDSUB
2686  013532                            L10072:
2687  013532  104003                            EMT     C$ESUB
2688
2689  013534                                  EXIT TST
2690  013534  104032                            EMT     C$EXIT
2691  013536  000570                            .WORD   L10065-.
2692
2693  013540  000000                    ADDON:  .WORD   0
2694  013542  000000                    PGCT:   .WORD   0
2695  013544  000000                    LOD1:   .WORD   0
2696  013546  000000                    LOD2:   .WORD   0
2697  013550  000000                    LOD3:   .WORD   0
2698  013552  000000                    LOD4:   .WORD   0
2699
2700
2701  013554                            BGNMSG  CKSME
2702  013554                            CKSME::
2703  013554                            PRINTB  #ERM6,BYTLOC
2704  013554  013746  002240                    MOV     BYTLOC,-(SP)
2705  013560  012746  013726                    MOV     #ERM6,-(SP)
2706  013564  012746  000002                    MOV     #2,-(SP)
2707  013570  010600                            MOV     SP,R0
2708  013572  104014                            EMT     C$PNTB
2709  013574  062706  000006                    ADD     #6,SP
2710  013600  004737  004356            JSR     PC,VIRTAD
2711  013604  004737  004102            JSR     PC,VIPRI
2712  013610                            ENDMSG
2713  013610                            L10073:
2714  013610  104023                            EMT     C$MSG
2715
2716  013612                            BGNMSG  CWKDE
2717  013612                            CWKDE::
2718  013612                            PRINTB  #ERM5
2719  013612  012746  013676                    MOV     #ERM5,-(SP)
2720  013616  012746  000001                    MOV     #1,-(SP)
2721  013622  010600                            MOV     SP,R0
2722  013624  104014                            EMT     C$PNTB
2723  013626  062706  000004                    ADD     #4,SP
2724  013632  004737  004356            JSR     PC,VIRTAD
2725  013636  004737  004102            JSR     PC,VIPRI
2726  013642                            ENDMSG
2727  013642                            L10074:
2728  013642  104023                            EMT     C$MSG
2729
2730  013644                            BGNMSG  NONXT
2731  013644                            NONXT::
2732  013644                            PRINTB  #LOST
2733  013644  012746  013755                    MOV     #LOST,-(SP)
2734  013650  012746  000001                    MOV     #1,-(SP)
2735  013654  010600                            MOV     SP,R0
2736  013656  104014                            EMT     C$PNTB
2737  013660  062706  000004                    ADD     #4,SP
2738  013664  004737  004356            JSR     PC,VIRTAD
2739  013670  004737  004102            JSR     PC,VIPRI
2740  013674                            ENDMSG
```

```
2741  013674                                L10075:
2742  013674  104023                              EMT     CSMSG
2743
2744  013676  040445  047111  047503  ERM5:   .ASCIZ  /%AINCORRECT CHECKWORD%N/
2745  013704  051122  041505  020124
2746  013712  044103  041505  053513
2747  013720  051117  022504  000116
2748
2749  013726  040445  044103  041505  ERM6:   .ASCIZ  /%ACHECKSUM ERROR%N%T%N/
2750  013734  051513  046525  042440
2751  013742  051122  051117  047045
2752  013750  052045  047045     000
2753
2754  013755     045  047101  047117  LOST:   .ASCIZ  /%ANON-EXISTENT MEMORY%N/
2755  013762  042455  044530  052123
2756  013770  047105  020124  042505
2757  013776  047515  054522  047045
2758  014004     000
2759
2760  014005     110  053517  046440  RWDCT:  .ASCIZ  /HOW MANY CHECKWORDS WILL BE INPUT/
2761  014012  047101  020131  044103
2762  014020  041505  053513  051117
2763  014026  051504  053440  046111
2764  014034  020114  042502  044440
2765  014042  050116  052125     000
2766
2767  014047     101  054516  040440  EXEC:   .ASCIZ  /ANY ADDITIONAL MEMORY /
2768  014054  042104  052111  047511
2769  014062  040516  020114  042515
2770  014070  047515  054522  000040
2771
2772  014076  054105  040520  042116  EXPND:  .ASCIZ  /EXPANDED DIAGNOSTIC ROM/
2773  014104  042105  042040  040511
2774  014112  047107  051517  044524
2775  014120  020103  047522  000115
2776
2777  014126  050105  047522  020115  EPRM:   .ASCIZ  /EPROM IN SOCKETS/
2778  014134  047111  051440  041507
2779  014142  042513  051524     000
2780
2781  014147     123  051531  042524  SYSR:   .ASCIZ  /SYSTEM ROM/
2782  014154  020115  047522  000115
2783
2784  014162  054523  052123  046505  SYSE:   .ASCIZ  /SYSTEM EPROM/
2785  014170  042440  051120  046517
2786  014176     000
2787
2788  014177     105  050130  047101  EXADD:  .ASCIZ  /EXPANDED ROM IN 2-4K /
2789  014204  042504  020104  047522
2790  014212  020115  047111  031040
2791  014220  032055  020113     000
2792
2793  014225     105  051120  046517  EPADD:  .ASCIZ  /EPROM IN 4-6K /
2794  014232  044440  020116  026464
2795  014240  046460  000040
2796
```

```
014244 054523 052123 046505  SRR:    .ASCIZ  /SYSTEM ROM START AT 16K/
014252 051040 046517 051440
014260 040524 052122 040440
014266 020124 033061 000113

014274 054523 052123 046505  SYEE:   .ASCIZ  /SYSTEM EPROM START AT 16K/
014302 042440 051120 046517
014310 051440 040524 052122
014316 040440 020124 033061
014324 000113



                                     .EVEN
014326                               ENDTST
014326                       [illegible]065:
014326 1040[illegible]               EMT     $SETST
```

```
                        .TITLE PARAMETER CODING
                        .SBTTL  IDENTIFICATION
```

```
                                .SBTTL  HARDWARE PARAMETER CODING SECTION


                                ;++
                                ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
                                ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
                                ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
                                ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
                                ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
                                ; WITH THE OPERATOR.
                                ;--

014330                                  BGNHRD
014330  000073                          .WORD L10076-L$HARD/2
014332                          L$HARD::

014332                                  GPRMD   UNIT,0,0,160000,0,16,YES
014332  000032                          .WORD   T$CODE
014334  014404                          .WORD   UNIT
014336  160000                          .WORD   160000
014340  000000                          .WORD   T$LOLIM
014342  000016                          .WORD   T$HILIM
014344                                  GPRMD   INTVEC,2,0,-1,66,100,YES
014344  001032                          .WORD   T$CODE
014346  014420                          .WORD   INTVEC
014350  177777                          .WORD   -1
014352  000066                          .WORD   T$LOLIM
014354  000100                          .WORD   T$HILIM
014356                                  GPRMD   PRI,4,0,-1,0,7,YES
014356  002032                          .WORD   T$CODE
014360  014451                          .WORD   PRI
014362  177777                          .WORD   -1
014364  000000                          .WORD   T$LOLIM
014366  000007                          .WORD   T$HILIM
014370                                  GPRMD   RKSW,6,0,-1,0,7777,YES
014370  003032                          .WORD   T$CODE
014372  014471                          .WORD   RKSW
014374  177777                          .WORD   -1
014376  000000                          .WORD   T$LOLIM
014400  007777                          .WORD   T$HILIM

014402                                  EXIT HRD
014402  047004                          .WORD   T$CODE

014404  047125  052111  047040    UNIT:   .ASCIZ  /UNIT NUMBER/
014412  046525  042502  000122
014420  047111  042524  051122    INTVEC: .ASCIZ  /INTERRUPT VECTOR ADDRESS/
014426  050125  020124  042526
014434  052103  051117  040440
014442  042104  042522  051523
014450     000
014451     111  052116  051105    PRI:    .ASCIZ  /INTERRUPT LEVEL/
014456  052522  052120  046040
014464  053105  046105     000
014471     122  041517  042513    RKSW:   .ASCIZ  /ROCKER SWITCH SETTINGS/
014476  020122  053523  052111
```

```
 2882  014504  044103  051440  052105
 2883  014512  044524  043516  000123
 2884                                  .EVEN
 2885
 2886  014520                          ENDHRD
 2887                                  .EVEN
 2888  014520                  L10076:
```

```
2889                                    .SBTTL  SOFTWARE PARAMETER CODING SECTION
2890
2891                                    ;++
2892                                    ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
2893                                    ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
2894                                    ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
2895                                    ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
2896                                    ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
2897                                    ; WITH THE OPERATOR.
2898                                    ;--
2899
2900  014520                                    BGNSFT
2901  014520  000161                           .WORD L10077-L$SOFT/2
2902  014522                            L$SOFT::
2903  014522                                    GPRMD   CKW1,0,0,-1,0,177777,YES
2904  014522  000032                           .WORD   T$CODE
2905  014524  014644                           .WORD   CKW1
2906  014526  177777                           .WORD   -1
2907  014530  000000                           .WORD   T$LOLIM
2908  014532  177777                           .WORD   T$HILIM
2909  014534                                    GPRMD   CKW2,2,0,-1,0,177777,YES
2910  014534  001032                           .WORD   T$CODE
2911  014536  014721                           .WORD   CKW2
2912  014540  177777                           .WORD   -1
2913  014542  000000                           .WORD   T$LOLIM
2914  014544  177777                           .WORD   T$HILIM
2915  014546                                    GPRMD   CKW3,4,0,-1,0,177777,YES
2916  014546  002032                           .WORD   T$CODE
2917  014550  014737                           .WORD   CKW3
2918  014552  177777                           .WORD   -1
2919  014554  000000                           .WORD   T$LOLIM
2920  014556  177777                           .WORD   T$HILIM
2921  014560                                    GPRMD   CKW4,6,0,-1,0,177777,YES
2922  014560  003032                           .WORD   T$CODE
2923  014562  014755                           .WORD   CKW4
2924  014564  177777                           .WORD   -1
2925  014566  000000                           .WORD   T$LOLIM
2926  014570  177777                           .WORD   T$HILIM
2927  014572                                    GPRMD   CKW5,10,0,-1,0,177777,YES
2928  014572  004032                           .WORD   T$CODE
2929  014574  014773                           .WORD   CKW5
2930  014576  177777                           .WORD   -1
2931  014600  000000                           .WORD   T$LOLIM
2932  014602  177777                           .WORD   T$HILIM
2933  014604                                    GPRMD   CKW6,12,0,-1,0,177777,YES
2934  014604  005032                           .WORD   T$CODE
2935  014606  015011                           .WORD   CKW6
2936  014610  177777                           .WORD   -1
2937  014612  000000                           .WORD   T$LOLIM
2938  014614  177777                           .WORD   T$HILIM
2939  014616                                    GPRMD   CKW7,14,0,-1,0,177777,YES
2940  014616  006032                           .WORD   T$CODE
2941  014620  015027                           .WORD   CKW7
2942  014622  177777                           .WORD   -1
2943  014624  000000                           .WORD   T$LOLIM
2944  014626  177777                           .WORD   T$HILIM
```

```
2945  014630                                        GPRMD   CKW8,16,0,-1,0,177777,YES
2946  014630  007032                                .WORD   T$CODE
2947  014632  015045                                .WORD   CKW8
2948  014634  177777                                .WORD   -1
2949  014636  000000                                .WORD   T$LOLIM
2950  014640  177777                                .WORD   T$HILIM
2951
2952  014642                                        EXIT SFT
2953  014642  111004                                .WORD   T$CODE
2954
2955  014644  044103  041505  053513  CKW1:   .ASCIZ  /CHECKWORDS FOR DIAGNOSTIC ROM. CHECKWORD 1: /
2956  014652  051117  051504  043040
2957  014660  051117  042040  040511
2958  014666  047107  051517  044524
2959  014674  020103  047522  027115
2960  014702  041440  042510  045503
2961  014710  047527  042122  030440
2962  014716  020072     000
2963  014721     103  042510  045503  CKW2:   .ASCIZ  /CHECKWORD 2: /
2964  014726  047527  042122  031040
2965  014734  020072     000
2966  014737     103  042510  045503  CKW3:   .ASCIZ  /CHECKWORD 3: /
2967  014744  047527  042122  031440
2968  014752  020072     000
2969  014755     103  042510  045503  CKW4:   .ASCIZ  /CHECKWORD 4: /
2970  014762  047527  042122  032040
2971  014770  020072     000
2972  014773     103  042510  045503  CKW5:   .ASCIZ  /CHECKWORD 5: /
2973  015000  047527  042122  032440
2974  015006  020072     000
2975  015011     103  042510  045503  CKW6:   .ASCIZ  /CHECKWORD 6: /
2976  015016  047527  042122  033040
2977  015024  020072     000
2978  015027     103  042510  045503  CKW7.   .ASCIZ  /CHECKWORD 7: /
2979  015034  047527  042122  033440
2980  015042  020072     000
2981  015045     103  042510  045503  CKW8:   .ASCIZ  /CHECKWORD 8: /
2982  015052  047527  042122  034040
2983  015060  020072     000
2984          015064                                .EVEN
2985
2986
2987  015064                                        ENDSET
2988                                                .EVEN
2989  015064                                L10077:
2990
2991          015134                        .=.+50
2992  015134                                        LASTAD
2993                                                .EVEN
2994  015134                                L$LAST::
```

```
2995
2996  045730  000000                    .SBTTL  DIAGNOSTIC SUPERVISOR -- LOW CORE SET UP
      045732  000000                    .WORD   0               ;SPACE FOR USER POOL POINTER
      045734  000000                    .WORD   0               ;SIZE
      045736  000000                    .WORD   0               ;CHECKSUM (NOT CURRENTLY USED)
              045742                    .WORD   0               ;SIZE OF H.W. PTAB. ALLOCATION
              000200                    END.SUPV-.+2
                                        .END 200
```

```
ABOFLA  015460 G  2996#*
ABOPAS  015376 G  2996#*
ABO.FM  017740    2996#
ACTSUM  002202     562#   899*   903*  1008  1025  2043  2073
ADDON   013540    1167*  2269*  2286  2291  2693#
ADDTL   012556    2479#  2488   2494  2500
AFSI    015166 G  2996#
ALLOC   036100    2996#
ANSR    002174     559#  1168*  2353  2358  2360*  2435  2440  2442*  2525  2530  2532*  2614  2619
                  2621*
APT.ER  017070    2996#
ASSEMB= 000010     359
A$AAV   021736    2996#
A$AAW   021752    2996#
A$AAX   021764    2996#
A$AAY   021772    2996#
A$AAZ   022006    2996#
A$ABA   022016    2996#
BCF     002164     555#   898   901  1002*  1015*  2029*  2059*  2386  2468  2558  2647
BDDAT   003154     684#   791
BEVENT  007134 G  1726#
BEVREG= 177546    1658#  1674*  1699*
BGN.SU= 015134    2996#
BINMSG  034410    2996#
BIT0  = 000001 G  1878   1900   1914
BIT06 = 000100 G  1674   1699
BIT15 = 100000 G  1367   1392   1596  1621  1880
BLD.HW  022622    2996#
BLOCK   040234    2996#
BVERR1  007144 G  1689   1735#
BVERR2  007212 G  1714   1754#
BYTINS  003217     691#   811
BYTLOC  002240     577#  2388*  2390*  2470*  2472*  2560*  2562*  2649*  2651*  2704
B$AAB   024224    2996#
B$AAF   024136    2996#
CALLPC= 000022    2996#*
CALLPS= 000024    2996#*
CALLSP= 000026    2996#*
CALLTC= 000030    2996#*
CAL.CL  042622    2996#*
CAL.TI  042660 G  2996#
CHKLUP  024240    2996#
CHKSTR  036442    2996#
CHKSUM  004132     897#  1006   1023  2041  2071
CHKTTY  034530    2996#
CHK.MA  022400    2996#
CHK.PC  027530    2996#*
CHK.SW  016570    2996#
CHRCNT  035762    2996#*
CH.FLA  022106    2996#*
CH.PAS  022124    2996#
CKERR   002634     623#  2132   2158
CKSME   013554 G  2408   2487   2576  2665  2702#
CKWD    002226     572#  1035   1038  2379*  2461*  2551*  2640*
CKW1    014644    2905   2955#
CKW2    014722    2911   2961#
```

```
CKW3    014737            2917    2966#
CKW4    014755            2923    2969#
CKW5    014773            2929    2972#
CKW6    015011            2935    2975#
CKW7    015027            2941    2978#
CKW8    015045            2947    2981#
CLEAR.  023522            2996#
CLKACC  015374 G          2996#*
CLKBFR  042624            2996#*
CLKCNT  015372 G          2996#*
CLKJUM  043230 G          2996#
CLKRES  044232 G          2996#
CLKSER  044366 G          2996#
CLKSON  015432 G          2996#*
CLK.SE  022202            2996#
CLR.MA  022456            2996#
CNVT    040700            2996#
COMMAN  015204 G          2996#*
COMMTA  040514            2996#
CONT    013446            2645    2655#
CONTCL  044312 G          2996#
COUNTR  002172             558#   2026*  2104*  2378*  2395*  2460*  2477*  2550*  2567*  2639*  2656*
CRLF    034612            2996#
CURR.S  015142 G          2996#*
CURR.T  015144 G          2996#*
CWDERR  002653             627#
CWKDE   013612 G          2414    2493    2582    2673    2717#
C$AAD   027502            2996#
C$AAE   027514            2996#
C$AAK   030512            2996#
C$AAL   030656            2996#
C$ABRT= 000021             359#
C$ADR - 000020             359#   1206    1227    1248    1269    1288    1309    1330    1351    1376    1403    1434    1455
                  1477     1498    1519    1539    1559    1580    1605    1632    2405    2411    2417    2484    2490
                  2496     2573    2579    2585    2662    2670    2678
C$AU  = 000054             359#
C$BRK = 000022             359#
C$BSEG- 000004             359#
C$BSUB= 000002             359#   1200    1220    1241    1262    1283    1302    1323    1344    1365    1390    1428    1448
                  1470     1491    1512    1532    1552    1573    1594    1619    1666    1698    1994    2058    2087
                  2102     2264    2345    2427    2506    2595
C$BUFF - 000030            359#
C$CEFG= 000046             359#
C$CLEA- 000012             359#   1183
C$CLP1= 000006             359#    981    1214    1235    1256    1277    1296    1317    1338    1359    1384    1411    1442
                  1463     1485    1506    1527    1547    1567    1588    1613    1640    1691    1716    1871    2040
                  2051     2070    2081    2095
C$CVEC= 000036             359#   1173
C$DCLN= 000044             359#
C$DODU= 000053             359#
C$DRPT= 000024             359#
C$DU  = 000055             359#
C$EDIT- 000002             359#   425
C$ERDF- 000002             359#    977    1206    1227    1248    1269    1288    1309    1330    1351    1376    1403    1434
                  1455     1477    1498    1519    1539    1559    1580    1605    1632    1687    1712    1867    2033
                  2047     2063    2077    2091    2405    2411    2417    2484    2490    2496    2573    2579    2585
```

```
                    2662    2670    2678
C$ERHR= 000003       359#
C$ERSF= 000001       359#
C$ERSO= 000004       359#
C$ESCA= 000010       359#
C$ESEG= 000005       359#
C$ESUB= 000003       359#    1217    1238    1259    1280    1299    1320    1341    1362    1387    1414    1445    1466
                    1488    1509    1530    1550    1570    1591    1616    1643    1695    1720    2054    2084    2098
                    2108    2341    2424    2503    2592    2687
C$ETST= 000001       359#    1418    1646    1798    1847    1982    2236    2812
C$EXIT= 000032       359#    1137    1176    1211    1232    1253    1274    1293    1314    1335    1356    1381    1408
                    1439    1460    1482    1503    1524    1544    1564    1585    1610    1637    1663    1722    1822
                    1842    1873    1935    2037    2067    2111    2337    2402    2570    2659    2667    2675    2683
                    2690
C$GMAN= 000043       359#     924    2002    2014    2284    2294    2304    2315    2326    2351    2362    2433    2444
                    2509    2523    2534    2598    2612    2623
C$GPHR= 000042       359#    1117
C$GPRI= 000040       359#
C$GTIM= 000052       359#
C$INIT= 000011       359#    1152
C$INLP= 000020       359#
C$KWOF= 000035       359#
C$KWON= 000034       359#
C$LOOP= 000100       359#    1206    1227    1248    1269    1288    1309    1330    1351    1376    1403    1434    1455
                    1477    1498    1519    1539    1559    1580    1605    1632    1687    1712    2033    2047    2063
                    2077    2091    2405    2411    2417    2484    2490    2496    2573    2579    2585    2662    2670
                    2678
C$MANI= 000051       359#    1126    1816    1861    1996    2266
C$MSG = 000023       359#     766     786     806     826     838     850     862    1751    1770    1954    2127    2140
                    2153    2166    2179    2714    2728    2742
C$PNTB= 000014       359#     754     774     794     814     834     846     858    1740    1747    1759    1766    1950
                    2123    2136    2149    2162    2174    2708    2722    2736
C$PNTF= 000017       359#     872     921    1133    1895    1907    1921    1931
C$PNTS= 000016       359#
C$PNTX= 000015       359#     762     782     802     822
C$POIN= 000040       359#     977    1206    1227    1248    1269    1288    1309    1330    1351    1376    1403    1434
                    1455    1477    1498    1519    1539    1559    1580    1605    1632    1687    1712    1867    2033
                    2047    2063    2077    2091    2405    2411    2417    2484    2490    2496    2573    2579    2585
                    2662    2670    2678
C$QIO - 000377       359#
C$RDBU= 000007       359#
C$REFG  000050       359#
C$REQT= 000045       359#
C$RESE= 000033       359#
C$REVI= 000002       359#     424
C$RPT = 000025       359#    1103
C$SEFG= 000047       359#
C$SPRI= 000041       359#    1124    1677    1683    1702    1708
C$SVEC= 000037       359#    1672
C$TPRI= 000013       359#
C$UNBU= 000031       359#
C$WTM = 000026       359#    1810    1814    1828    1832    1856    1860
C$WTU = 000027       359#    1688    1692
DADDR   011503      2006    2224#
DATOUT  012234      2389    2391#
DECMSG  034424      2994#
```

```
DERR1    010760 G      2035    2117#
DERR2    011006 G      2049    2130#
DERR3    011034 G      2065    2143#
DERR4    011062 G      2079    2156#
DERR5    011110 G      2093    2169#
DEVDAT   002512 G       594#
DEV.CO   015146 G      2996#*
DFLTST   011760        2268    2281    2292    2334    2336#
DFPTBL   002132 G       489#
DIAGER   003406         715#    855
DIAGMC=  000000         359
DIAG.T   015466 G      2996#*
DIAIN    011634        2293#
DLOOP    010524        2029#   2105
DPDVD    045076 G      2996#
DPMUL    044764 G      2996#
DRLP     010756        2011*   2024*   2025    2114#
DRTST    010504        2026#
DSPCOD   002110 G       465#
DUNIT.   015402 G      2996#*
DVC.FT   030462        2996#
D$AAG    031366        2996#
D$AAH    031404        2996#
D$AAI    034152        2996#
D$AAJ    034156        2996#
D$AAK    034174        2996#
D$AAL    034212        2996#
D$AAM    034222        2996#
EMT.TR   015464 G      2996#*
END.OF   023510        2996#
END.SU=  045742        2996#*
ENVIRO   015206 G      2996#*
EOP.CH   044410 G      2996#
EOP.FM   017754        2996#
EOP.IN   022120        2996#*
EPADD    014225        2437    2793#
EPRIN    011656        2303#   2399
EPRM     014126        2308    2486    2492    2498    2777#
EPRMT    012316        2313    2428#
EPROM    002264         580#   2430    2459
EPRTST   012454        2461#   2478
ERM5     013676        2719    2744#
ERM6     013726        2705    2749#
ERRFLG   002242         578#   1011*   1028*   1040*   2346*   2383    2391    2428*   2465    2473    2507*   2555    2563
                       2596*   2644    [illegible]
ERRFOR   030734        2996#
ERRHAN   027534        2996#
ERR.HR   030472        2996#
ERR.NU   015[illegible]36 G  2996#*
ERR.SF   030[illegible]76    2996#
ERR1FO   031020        2996#
ESC.PC   027526        2996#*
EV.COU   015140 G      2996#*
EXADD    014177        2355    [illegible]#
EXEC     014047        2288    [illegible]#
EXPDIA   002244        [illegible]#   [illegible]   [illegible]
```

```
EXPND   014076            2298    2407    2413    2419    2772#
EXPROM  011770            2302    2346#
EXPSUM  002200             561#   1007*   1008*   1009    1024*   1025*   1026    2042*   2043*   2044    2072*   2073*   2074
EXPTST  012130            2379#   2396
E1      012254            2392    2404#
E10     013144            2565    2578#
E11     013156            2554    2584#
E12     013466            2653    2661#
E13     013502            2654    2669#
E14     013516            2643    2677#
E2      012266            2393    2410#
E3      012300            2382    2416#
E4      012574            2474    2483#
E5      012606            2475    2489#
E6      012620            2464    2495#
E7      013132            2564    2572#
FILL    035260            2996#
FILL.C  000204 G          2996#
FLAGS   015200 G          2996#*
FLAGS1  015202 G          2996#
FLAGTA  040432            2996#
FLAG.I  022166            2996#
FLA.SE  040400            2996#
FLG.MA  022126            2996#
FORM.T  031030            2996#*
FREE    036336            2996#
F$AU  = 000015             359#
F$BGN   000040             359#    369     456     465     477     540     546     554     583     749     769     789     809
                           829     841     853    1100    1114    1137    1161    1176    1198    1200    1211    1216    1220
                          1232    1237    1241    1253    1258    1262    1274    1279    1283    1293    1298    1302    1314
                          1319    1323    1335    1340    1344    1356    1361    1365    1381    1386    1390    1408    1413
                          1417    1426    1428    1439    1444    1448    1460    1465    1470    1482    1487    1491    1503
                          1508    1512    1524    1529    1532    1544    1549    1552    1564    1569    1573    1585    1590
                          1594    1610    1615    1619    1637    1642    1645    1657    1663    1666    1694    1698    1719
                          1722    1726    1735    1754    1797    1806    1822    1842    1846    1859    1873    1935    1943
                          1981    1992    1994    2037    2053    2058    2067    2083    2087    2097    2102    2107    2111
                          2117    2130    2143    2156    2169    2235    2262    2264    2337    2340    2345    2402    2423
                          2427    2502    2506    2570    2591    2595    2659    2667    2675    2683    2686    2690    2702
                          2717    2731    2811    2839    2868    2901    2953
F$CLEA- 0000C7             359#   1161    1182
F$DU  = 0000*6             359#
F$END   000041             359#    369     456     465     477     540     546     554     583     767     787     807     827
                           839     851     863    1104    1137    1153    1176    1184    1198    1200    1211    1216    1218
                          1220    1232    1237    1239    1241    1253    1258    1260    1262    1274    1279    1281    1283
                          1293    1298    1300    1302    1314    1319    1321    1323    1335    1340    1342    1344    1356
                          1361    1363    1365    1381    1386    1388    1390    1408    1413    1415    1417    1419    1426
                          1428    1439    1444    1446    1448    1460    1465    1467    1470    1482    1487    1489    1491
                          1503    1508    1510    1512    1524    1529    1531    1532    1544    1549    1551    1552    1564
                          1569    1571    1573    1585    1590    1592    1594    1610    1615    1617    1619    1637    1642
                          1644    1645    1647    1657    1663    1666    1694    1696    1698    1719    1721    1722    1731
                          1752    1771    1797    1799    1806    1822    1842    1846    1848    1859    1873    1935    1955
                          1981    1983    1992    1994    2037    2053    2055    2058    2067    2083    2085    2087    2097
                          2099    2102    2107    2109    2111    2128    2141    2154    2167    2180    2235    2237    2262
                          2264    2337    2340    2342    2345    2402    2423    2425    2427    2502    2504    2506    2570
                          2591    2593    2595    2659    2667    2675    2683    2684    2688    2690    2715    2719    2743
                          2811    2817    2868    2885    2953    ***
```

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F$HARD= 000004   359# 2839 2868 2887 2953
F$HW  = 000013   359#  487  498
F$INIT= 000006   359# 1114 1151
F$JMP = 000050   359# 1137 1176 1211 1232 1253 1274 1293 1314 1335 1356 1381 1408
                1439 1460 1482 1503 1524 1544 1564 1585 1610 1637 1663 1722 1822
                1842 1873 1935 2037 2067 2111 2337 2402 2570 2659 2667 2675 2683
                2690 2868 2953
F$MOD  000000   359#  370  456  466  477  541  546  555  583
F$MSG = 000011   359#  749  765  769  785  789  805  809  825  829  837  841  849
                853  861 1735 1750 1754 1769 1943 1953 2117 2126 2130 2139 2143
                2152 2156 2165 2169 2178 2702 2713 2717 2727 2731 2741
F$PWR - 000017   359#
F$RPT = 000012   359# 1100 1102
F$SEG  000003   359#
F$SOFT= 000005   359# 2901 2953 2988
F$SRV - 000010   359# 1726 1729
F$SUB - 000002   359# 1200 1216 1220 1237 1241 1258 1262 1279 1283 1298 1302 1319
                1325 1340 1344 1361 1365 1386 1390 1413 1428 1444 1448 1465 1470
                1487 1491 1508 1512 1529 1532 1549 1552 1569 1573 1590 1594 1615
                1619 1642 1666 1694 1698 1719 1994 2053 2058 2083 2087 2097 2102
                2107 2264 2340 2345 2423 2427 2502 2506 2591 2595 2686
F$SW  = 000014   359#  508  525
F$TEST= 000001   359# 1198 1417 1426 1645 1657 1797 1806 1846 1859 1981 1992 2235
                2262 2811
GARBAG  035764   2996#
GET     011612   2271 2283#
GETAD   010444   2010 2013#
GETCHR  034470   2996#
GETCMN  040054   2996#
GETPAR  031546   2996#
GETSWI  037050   2996#
GET.TW  036620   2996#
GLBDAT  002164 G  554#
GLBEQA  002164 G  540#
G$EXCP= 000400   359#
G$HILI= 000002   359#
G$LOLI= 000001   359#
G$NO  = 000000   359#  927 2017 2297 2307 2318 2329 2365 2447 2512 2537 2601 2626
G$OFFS= 000400   359#  927 2005 2017 2287 2297 2307 2318 2329 2354 2365 2436 2447
                2512 2526 2537 2601 2615 2626 2843 2849 2855 2861 2904 2910 2916
                2922 2928 2934 2940 2946
G$OFSI  000376   359#  927 2005 2017 2287 2297 2307 2318 2329 2354 2365 2436 2447
                2512 2526 2537 2601 2615 2626 2843 2849 2855 2861 2904 2910 2916
                2922 2928 2934 2940 2946
G$PRMA= 000001   359#
G$PRMD= 000002   359#  927 2017 2365 2447 2512 2537 2601 2626 2843 2849 2855 2861
                2904 2910 2916 2922 2928 2934 2940 2946
G$PRML = 000000  359# 2005 2287 2297 2307 2318 2329 2354 2436 2526 2615
G$RADA= 000140   359#
G$RADB= 000000   359#
G$RADD= 000040   359# 2017 2365 2447 2512 2537 2601 2626
G$RADF= 000200   359#
G$RADL= 000120   359# 2005 2287 2297 2307 2318 2329 2354 2436 2526 2615
G$RADO= 000020   359#  927 2843 2849 2855 2861 2904 2910 2916 2922 2928 2934 2940
                2946
G$RADT  000100   359#
```

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G$XFER= 000004          359#  2868  2953
G$YES = 000010          359#  2005  2287  2354  2436  2526  2615  2843  2849  2855  2861  2904  2910
                       2916  2922  2928  2934  2940  2946
HBYTE   013426         2648  2651#
HCORED  021676         2996#
HCOREQ  021606         2996#
HCORET  015422 G       2996#*
HC.ADR  015172 G       2996#
HC.DEF  015164 G       2996#
HC.DIA  015162 G       2996#
HELP  = 000000            6#    15    18    21    25    76    81    98   106   111   115   134   221
                        225   261   266   285   358   364#  378   457   477   491   512   530#  543
                        597   664   738   877  1077  1079  1081  1083  1085  1087  1089  1091  1092
                       1093  1095# 1136  1148  1174  1179  1187# 2813  2815  2816  2818  2820  2822
                       2824# 2842  2870  2954  2985
HERTZ.  021546         2996#
HIADD   012522         2469  2472#
HIBYT   002741          639#  2390  2472  2562  2651
HIBYTE  004576         1004  1015#
HIGH    012176         2387  2390#
HIGHB   013072         2559  2562#
HIRANG  002236          576#   867   985*  986*  989*
HIROM   011335         2159  2207#
HOLDSP= 000020         2996#
HRAERR  011261         2146  2198#
HW.ADR  015170 G       2996#
H$AAB   041226         2996#
ICOUNT  007142         1684  1692*  1709  1717*  1727*  1732#  1743  1762
IDENT   005124         1130  1140#
ININIT  015412 G       2996#*
INITIA  034440         2996#
INIT.M  022524         2996#
INIT.R  015226 G       2996#
INLP    004216          923#   936
INPUT   004176          917#  2349  2431  2521  2610
INPUTA  035366         2996#
INSTR   004254          918   939#
INTCT   007334         1744  1763  1780#
INTFOR  030664         2996#
INTSR   007134         1669  1724#
INTVEC  014420         2850  2872#
INVAL.  021472         2996#
INVINT  030522         2996#
INV.SW  016524         2996#
INWORD  004342          928   949#
IN.SUF  023474         2996#
I$AU  - 000041          359#
I$CLN = 000041          359#  1161#  1176  1184#
I$DU  = 000041          359#
I$HRD = 000041         2839#  2889#
I$INIT= 000041          359#  1114#  1137  1153#
I$MOD = 000041          359#   369#   456#  465#  477#  540#  546#  554#  583#
I$MSG   000041          359#   749#   767#  769#  787#  789#  807#  809#  827#  829#  839#  841#  851#
                        853#   863#  1735#  1752#  1754#  1771#  1943#  1955#  2117#  2128#  2130#  2141#  2143#
                       2154#  2156#  2167#  2169#  2180#  2201#  2215#  2217#  2229#  2231#  2243#
I$PWR   000041          359#
```

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I$RPT = 000041          359#  1100#  1104#
I$SEG = 000041          359#  1198   1200   1220   1241   1262   1283   1302   1323   1344   1365   1390   1426
                       1428   1448   1470   1491   1512   1532   1552   1573   1594   1619   1657   1666   1698
                       1806   1859   1992   1994   2058   2087   2102   2262   2264   2345   2427   2506   2595
I$SFT = 000041         2901#  2990#
I$SRV = 000041          359#  1726#  1731#
I$SUB = 000041          359#  1198   1200#  1216#  1218#  1220#  1237#  1239#  1241#  1258#  1260#  1262#  1279#
                       1281#  1283#  1298#  1300#  1302#  1319#  1321#  1323#  1340#  1342#  1344#  1361#  1363#
                       1365#  1386#  1388#  1390#  1413#  1415#  1426   1428#  1444#  1446#  1448#  1465#  1467#
                       1470#  1487#  1489#  1491#  1508#  1510#  1512#  1529#  1531#  1532#  1549#  1551#  1552#
                       1569#  1571#  1573#  1590#  1592#  1594#  1615#  1617#  1619#  1642#  1644#  1657   1666#
                       1694#  1696#  1698#  1719#  1721#  1806   1859   1992   1994#  2053#  2055#  2058#  2083#
                       2085#  2087#  2097#  2099#  2102#  2107#  2109#  2262   2264#  2340#  2342#  2345#  2402
                       2423#  2425#  2427#  2502#  2504#  2506#  2591#  2593#  2595#  2686#  2688#
I$TST = 000041          359#  1198#  1200   1211   1220   1232   1241   1253   1262   1274   1283   1293   1302
                       1314   1323   1335   1344   1356   1365   1381   1390   1408   1417#  1419#  1426#  1428
                       1439   1448   1460   1470   1482   1491   1503   1512   1524   1532   1544   1552   1564
                       1573   1585   1594   1610   1619   1637   1645#  1647#  1657#  1663   1666   1698   1722
                       1797#  1799#  1806#  1822   1542   1846#  1848#  1859#  1873   1935   1981#  1983#  1992#
                       1994   2037   2058   2067   2087   2102   2111   2235#  2237#  2262#  2264   2337   2345
                       2427   2506   2570   2595   2659   2667   2675   2683   2690   2811#  2813#
J$JMP   000167          359#
KBPTR   015244 G       2996#*
KBUF    015246 G       2996#*
LD1     012102         2273   2373   2375#
LD2     012430         2276   2455   2457#
LD3     012776         2279   2545   2547#
LD4     013334         2282   2634   2636#
LINE.F  015462 G       2996#*
LOAD    005016         1062   1071#
LOADR   003004          646#  2018   2366   2448   2538   2627
LOAD.F  022122         2996#*
LOBYT   002677          632#  2388   2470   2560   2649
LOBYTE  004520         1002#
LOD1    013544         2272   2372*  2374*  2375   2695#
LOD2    013546         2274   2454*  2456*  2457   2696#
LOD3    013550         2277   2544*  2546*  2547   2697#
LOD4    013552         2280   2633*  2635*  2636   2698#
LOGMSG  034432         2996#
LOOP    005000         1065#  1069
LOPAG   002170          557#  1071*  1073*  2024   2372   2454   2544   2633
LORANG  002234          575#   868   984*   985
LOST    013755         2733   2754#
LOWROM  011212         2133   2190#
LP      007672         1878#  1885
LPADD   004374          966#   972   983
LPBFR   015242 G       2996#*
LPCNTR  015240 G       2996#*
LPT.AD  021564         2996#
LPT.RE  021560         2996#
LRAERR  011136         2120   2181#
LSI.RE  021554         2996#
LSREG = 177524          544#  1811*  1811*  1825*  1829*  1833*  1837*  1864   1875   1945
LUP     042526         2996#
LUP.AD  027532         2996#*
.SAVT   002036          473#
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L$AUT   002074 G          443#
L$CCP   002106 G          453#
L$CLEA  005200 G          454     1161#
L$CO    002032 G          409#
L$DEPO  002011 G          391#
L$DESC  002102 G          449#
L$DEVP  002064 G          435#
L$DISP  002112 G          416      468#
L$DR    002506 G          440      589#
L$DRCT  002070 G          439#
L$DRS   002072 G          441#
L$DRST  002512 G          442      593#
L$DTP   002040 G          415#
L$DUT   002076 G          445#
L$DVTY  003036 G          436      659#
L$EF    002056 G          430#
L$EFLG  002034 G          411#
L$EXP1  002042 G          417#
L$EXP2  002044 G          419#
L$EXP3  002046 G          421#
L$HARD  014332 G          398     2839     2840#
L$HPCP  002016 G          397#
L$HPTP  002022 G          401#
L$HW    002132 G          402      487      488#
L$ICP   002104 G          451#
L$INIT  005034 G          452     1114#
L$LADP  002026 G          405#
L$LAST  015134 G          406     2994#
L$MREV  002050 G          423#
L$NAME  002000 G          380#
L$REPP  002066 G          437#
L$REV   002010 G          389#
L$RPT   005032 G         1100#
L$SOFT  014522 G          400     2901     2902#
L$SPC   002062 G          433#
L$SPCP  002020 G          399#
L$SPTP  002024 G          403#
L$STA   002030 G          407#
L$SW    002144 G          404      508      509#
L$TIML  002014 G          395#
L$TIMU  002054 G          428#
L$TIM1  002052 G          426#
L$TSTI  002100 G          447#
L$UNIT  002012 G          393#
L.CLK.  021532           2996#
L10000  002142            487      498#
L10001  002164            508      525#
L10002  003630            765#
L10003  003676            785#
L10004  003744            805#
L10005  004012            825#
L10006  004034            837#
L10007  004056            849#
L10010  004100            861#
L10011  005032           1102#
L10012  005176           1138     1151#
```

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L10013  005256            1177    1182#
L10014  006076            1212    1233    1254    1275    1294    1315    1336    1357    1382    1409    1417#
L10015  005314            1216#
L10016  005364            1237#
L10017  005434            1258#
L10020  005502            1279#
L10021  005540            1298#
L10022  005610            1319#
L10023  005656            1340#
L10024  005724            1361#
L10025  006004            1386#
L10026  006074            1413#
L10027  006726            1440    1461    1483    1504    1525    1545    1565    1586    1611    1638    1645#
L10030  006134            1444#
L10031  006204            1465#
L10032  006254            1487#
L10033  006322            1508#
L10034  006370            1529#
L10035  006440            1549#
L10036  006506            1569#
L10037  006554            1590#
L10040  006634            1615#
L10041  006724            1642#
L10042  007460            1664    1723    1797#
L10043  007046            1694#
L10044  007126            1719#
L10045  007140            1729#
L10046  007210            1750#
L10047  007256            1769#
L10050  007620            1823    1843    1846#
L10051  010374            1874    1936    1981#
L10052  010174            1953#
L10053  011524            2038    2068    2112    2235#
L10054  010612            2053#
L10055  010706            2083#
L10056  010730            2097#
L10057  010750            2107#
L10060  011004            2126#
L10061  011032            2139#
L10062  011060            2152#
L10063  011106            2165#
L10064  011134            2178#
L10065  014326            2338    2571    2660    2668    2676    2684    2691    2811#
L10066  011764            2340#
L10067  012312            2403    2423#
L10070  012632            2502#
L10071  013170            2591#
L10072  013532            2686#
L10073  013610            2713#
L10074  013642            2727#
L10075  013674            2741#
L10076  014520            2839    2868    2888#
L10077  015064            2901    2953    2984#
MAJ.IN  015216 G          2996#*
MAJ.LO  042626            2996#*
MAJ.US  015220 G          2996#*
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MAN.TI  001244          2996#
MAP16   045334 G        2996#
MASK.B  024236          2996#
MASK.W  024234          2996#
MDHEDR  002000 G         369#
MEMTST  004514          1001#   2380    2462    2552    2641
MEM.SI  021574          2996#
MESSG1  010227          1904    1961#
MESSG2  010242          1918    1963#
MIN.IN  015212 G        2996#*
MIN.US  015214 G        2996#*
MISTAK  011405          2171    2215#
MODR    044676 G        2996#
MORE    012232          2397#   2409    2415    2421
MSGOUT  013100          2561    2563#
MSG.AD  015160 G        2996#
MSG.TY  015134 G        2996#*
MSG1    007260          1737    1772#
MSG2    007403          1756    1787#
MUL     044632 G        2996#
NEWLIN  010255          1928    1965#
NEWPRI  044356 G        2996#
NEXT    013126          2569#   2577    2583    2589
NEXTAR  040616          2996#
NODR    011457          2119    2145    2224#
NOERR   012216          2384    2394#
NONE    012542          2466    2476#
NONXT   013644 G        2420    2499    2588    2681    2731#
NO.CLK  021522          2996#
NO.FLA  040412          2996#
NO.LPT  035730          2996#
NO.PTA  021726          2996#
NR    = 000001           588#
NUMBIN  031054          2996#
NUM.LA  031222          2996#
NUM.NO  015176 G        2996#
NUM.UN  015604          2996#
NUNITS  024212          2996#
NXTFOR  040672          2996#
OCTMSG  034416          2996#
ONERR   003112           677#    771
OUT     005120          1128    1135#
OUTPUT  004462           967     984#
O$APTS= 000000           359#    407
O$AU  = 000000           359#    443
O$BGNR= 000000           359#    437
O$BGNS= 000001           359#    377#    399
O$DU  = 000000           359#    445
O$GNSW= 000001           359#    377#    403
O$POIN= 000001           359#    377#    455
O.ODT = ****** U        2996
PACR    002566           615#   1436    1457    1479    1500    1521    1541    1561    1582    1607    1634
PAGE    002212           566#    965*    966
PAGERR  004060 G         853#    979
PARSES  040126          2996#
PAR.LA  034114          2996#
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PASCT   002206            564#  1170*  1819  1824*
PASS    002204            563#  1169*  1660  1999  2270  2397  2479
PASSED  013112           2556   2566#
PASS.C  015150 G         2996#*
PCR   = 177520            543#   965   1163* 1429* 1432  1449* 1450  1453  1471* 1472  1475  1492* 1493
                         1496   1513* 1514  1517  1533* 1534  1537  1553* 1554  1557  1574* 1575  1578
                         1595*  1596* 1597  1598  1602* 1620* 1621* 1622  1623  1626* 2025* 2103* 2375*
                         2394*  2457* 2476* 2547* 2566* 2636* 2655*
PGCT    013542           2518*  2550  2607* 2639  2694#
PRI     014451           2856   2877#
PRIN    013434           2650   2652#
PRINTC  035740           2996#
PRINTF  041246           2996#
PRIOR   002224            571#  1120*
PRIOUT  012530           2471   2473#
PRI00 = 000000 G         1676   1701
PRI07 = 000340 G         1123   1668  1682  1707
PRNTST  035630           2996#
PRO.CM  022100           2996#*
PRTSW   007652           1863   1875#
PTAB.S  015420 G         2996#*
PUTCHR  034444           2996#
PWR.FA  045570 G         2996#
PWR.FL  015224 G         2996#*
PWR.MS  045716           2996#
PWR.SA  045712           2996#*
PWR.UP  045714           2996#*
P.CLK.  021540           2996#
P1      011566           2275   2277#  2400
P2      011600           2278   2280#  2482
READN   010176           1892   1956#
READ.P  042630 G         2996#
REAL    002166            556#  1001*  1005*  1018  1020*  1022*  1031  1033  2381  2463  2553  2642
REGBAC  045320 G         2996#
REGDT   003520            730#   759    779    799   819
REGMSK  002506 G          590#
REGSAV  045304 G         2996#
REQN.P  015210 G         2996#*
REQN.T  022102           2996#*
RERR1   003564 G          749#  1209  1437
RERR2   003632 G          769#  1230  1458
RERR3   003700 G          789#  1251  1312  1480  1542
RERR4   003746 G          809#  1272  1291  1333  1354  1501  1522  1562  1583
RERR5   004014 G          829#  1379  1608
RERR6   004036 G          841#  1406  1635
RESPND  002230            573#  1166* 2296  2301  2306  2311  2317  2322  2328  2333  2511  2518  2519
                         2600   2607  2608
RE.SET  016672           2996#
RFLAG   002176            560#   987  2028* 2376* 2458* 2548* 2637*
RKSW    014471           2862   2880#
ROTLP1  005746           1369#  1374
ROTLP2  006030           1394#  1400
ROTLP3  006576           1598#  1603
ROTLP4  006660           1623#  1629
ROT0    003334            707#   843
ROT1    003264            699#   831
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RSET    002232            574#  1165*  2004  2009
RSTACK  044560 G         2996#
RSTRT   010476           2000   2012   2025#
RWDCT   014005           2513   2602   2760#
RWR     002522            608#  1208   1229  1250  1271  1290  1311  1332  1353  1378  1405
RWREG = 177522           1164*  1195#  1201* 1204  1221* 1222  1225  1242* 1243  1246  1263* 1264  1267
                         1284*  1285   1303* 1304  1307  1324* 1325  1328  1345* 1346  1349  1366* 1367*
                         1368   1369   1373* 1391* 1392* 1393  1394  1397*
SAVEDO= 017070           2996#
SEARCH  036566           2996#
SEGSTA  015434 G         2996#*
SERR1   010260           1947   1966#
SETADR  004742           1054#  2023   2371  2453  2543  2632
SET.MA  022312           2996#
SFPTBL  002144 G          510#  2027
SHIFT   045416 G         2996#
SPEC.U  022026           2996#*
SPV.SE  000400           2996#
SRR     014244           2527   2797#
STARTC  044306 G         2996#
STORE   002220            569#   926   933  1054  2016  2364  2446  2536  2625
STRCHR  035320           2996#
STRT    010434           1998   2011#
STRT.T  022104           2996#*
SI.SET  016736           2996#
SUNIT.  022110           2996#*
SUPERV  017772           2996#
SUPFLA  015400 G         2996#*
SUPV.T  015552 G         2996#*
SUP.PR  016510           2996#
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                           450   451   452  453  454  465  466  468  469  488  489  490  509
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                           660   749   750  769  770  789  790  809  810  829  830  841  842
                           853   854  1100 1101 1114 1115 1161 1162 1726 1727 1735 1736 1754
                          1755  1943  1944 2117 2118 2130 2131 2143 2144 2156 2157 2169 2170
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SVCHAN  024426           2996#
SVCINS- 000000            359#  381  382  383  384  385  386  387  388  389  390  391  392
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                           445   446  447  448  449  450  451  452  453  454  455  467  468
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1863 1864 1867 1868 1869 1870 1871 1872 1873 1874 1875 1891 1892
1893 1894 1895 1896 1897 1903 1904 1905 1906 1907 1908 1909 1917
1918 1919 1920 1921 1922 1923 1928 1929 1930 1931 1932 1933 1935
1936 1937 1945 1946 1947 1948 1949 1950 1951 1952 1954 1955 1982
1983 1994 1995 1996 1997 1998 1999 2002 2003 2004 2005 2006 2007
2008 2014 2015 2016 2017 2018 2019 2020 2021 2022 2033 2034 2035
2036 2037 2038 2039 2040 2041 2047 2048 2049 2050 2051 2052 2054
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2176 2179 2180 2236 2237 2264 2265 2266 2267 2268 2269 2284 2285
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2412 2417 2424 2425 2426 2418 2419 2420 2421 2424 2425 2427 2428

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SVCSUB= 177777       359#  1200  1220  1241  1262  1283  1302  1323  1344  1365  1390  1428  1448
                    1470  1491  1512  1532  1552  1573  1594  1619  1666  1698  1994  2058  2087
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SVCTAG= 000000       359#  361#  498   499   525   526   765   766   785   786   805   806   825
                     826   837   838   849   850   861   862   932   933  1102  1103  1151  1152
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                    2009  2022  2023  2053  2054  2083  2084  2097  2098  2107  2108  2126  2127
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SVCTST  177777       359#  1198  1426  1657  1806  1859  1992  2262
SWCHAN  021720      2996#
SWCHON  010142      1876*  1880*  1882*  1887*  1888*  1889*  1891  1898  1940#
SWCNT   010136      1877*  1884*  1938#
SWERR   010144  G   1869  1943#
SWITCH  040572      2996#
SWSET   002216       568#  1121*  1864  1946
SW.ADR  015174  G   2996#
SW.PTA  021704      2996#
SYEE    014274      2616  2802#
SYETST  013360      2640#  2657
SYRTST  013024      2551#  2568
SYSE    014162      2330  2664  2672  2680  2784#
SYSEIN  011732      2323  2325#
SYSET   013174      2335  2596#
SYSR    014147      2319  2575  2581  2587  2781#
SYSRIN  011704      2312  2314#  2481
SYSROM  002304       581#  2520  2549  2609  2638
SYSRT   012636      2324  2507#
SYS.PT  030452      2994#
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                       2889#  2990#
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TAG2    010032         1901   1909#
TAG3    010050         1914#  1926
TAG4    010100         1915   1923#
TEMP    010140         1875*  1878   1883*  1[illegible]#
TERMI   042616         2996#
TERMLI  040420         2996#
TERMTA  034402         2996#
TEST.M  022040         2996#*
TIMFLG  015370 G       2996#*
TIM.CO  015222 G       2996#*
TIM.OP  031026         2996#*
TOO.MA  034362         2996#
TSTCKW  004672         1017   1027   1[illegible]#
TST.AB  024350         2996#
TST.TO  016552         2996#
TYPEC   034756         2996#
TYPEPC  030652         2996#
TYPFLA  040274         2996#
TYPLIN  034654         2996#
TYPNUM  034236         2996#
TYPSTR  034674         2996#
TYP.ER  030502         2996#
TY.UNI  023514         2996#
T$ARGC= 000001          381#   382#   383#   384#   385#   386#   38[illegible]#   751#   755    757#   763    771#   775
                        777#   783    791#   795    [illegible]#   803    81[illegible]#   815    8[illegible]#   823    831#   835    843#
                        847    855#   859    867#   873    918#   92[illegible]   1130#  1134   1737#  1741   1743#  1748
                       1756#  1760   1762#  1767   1891#  1896   190[illegible]#  1908   1917#  1922   1928#  1932   1945#
                       1951   2119#  2124   2132#  2137   2145#  215[illegible]   2158#  2163   2171#  2175   2704#  2709
                       2719#  2723   2733#  2737
T$CODE= 111004          927#  2005#  2017#  2287#  2297#  2307#  231[illegible]#  2329#  2354#  2365#  2436#  2447#  2512#
                       2526#  2537#  2601#  2615#  2626#  2843#  2849#  2855#  2861#  2868#  2904#  2910#  2916#
                       2922#  2928#  2934#  2940#  2946#  2953#
T$ERCO= 000162          977#  1206#  1227#  1248#  1269#  1288#  1309#  1330#  1351#  1376#  1403#  1434#  1455#
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                       2063#  2077#  2091#  2405#  24[illegible]#  2417#  242[illegible]  [illegible]90#  2496#  257[illegible]  2579#  2585#  2662#
                       2670#  2678#
T$ERRN= 000062          359#   978#  1207#  1228#  1249#  1270#  128[illegible]  [illegible]30#  1331#  1352#  1377#  1404#  1435#
                       1456#  1478#  1499#  1520#  [illegible]40#  [illegible]60#  [illegible]8[illegible]#  1606#  1633#  1688#  1713#  1868#  2034#
                       2048#  2064#  2078#  2092#  2406#  241[illegible]  24[illegible]#  2485#  2491#  2497#  2574#  2580#  2586#
                       2663#  267[illegible]#  2679#
T$EXCP= 000000          927#   932    2017#  2022   2365#  237[illegible]  2447#  2452   2512#  2517   2537#  2542   2601#
                       2606   2626#  2631   2843#  2848   2849#  2854   2855#  2860   2861#  2866   2904#  2909
                       2910#  291[illegible]  29[illegible]#  29[illegible]  29[illegible]#  29[illegible]  29[illegible]#  29[illegible]  29[illegible]#  29[illegible]  29[illegible]#  2946#
                       2951
T$F.AB= 000041          [illegible]37#  [illegible]#  [illegible]#  [illegible]#  [illegible]#  [illegible]#  [illegible]#  [illegible]#  [illegible]#  [illegible]#  [illegible]#  [illegible]#  [illegible]#
```

```
                    1460#  1482#  1503#  1524#  1544#  1564#  1585#  1610#  1637#  1663#  1722#  1822#  1842#
                    1873#  1935#  2037#  2067#  2111#  2337#  2402#  2570#  2659#  2667#  2675#  2683#  2690#
                    2868#  2953#
T$HILI  177777       927#   931   2017#  2021   2365#  2369   2447#  2451   2512#  2516   2537#  2541   2601#
                    2605   2626#  2630   2843#  2847   2849#  2853   2855#  2859   2861#  2865   2904#  2908
                    2910#  2914   2916#  2920   2922#  2926   2928#  2932   2934#  2938   2940#  2944   2946#
                    2950
T$LOLI= 000000       927#   930   2017#  2020   2365#  2368   2447#  2450   2512#  2515   2537#  2540   2601#
                    2604   2626#  2629   2843#  2846   2849#  2852   2855#  2858   2861#  2864   2904#  2907
                    2910#  2913   2916#  2919   2922#  2925   2928#  2931   2934#  2937   2940#  2943   2946#
                    2949
T$LSYM= 010000       359#   499    526    766    786    806    826    838    850    862   1103   1152   1183
                    1217   1238   1259   1280   1299   1320   1341   1362   1387   1414   1418   1445   1466
                    1488   1509   1530   1550   1570   1591   1616   1643   1646   1695   1720   1730   1751
                    1770   1798   1847   1954   1982   2054   2084   2098   2108   2127   2140   2153   2166
                    2179   2236   2341   2424   2503   2592   2687   2714   2728   2742   2812   2889   2990
T$NEST= 177777       359#   370#   456#   466#   477#   487#   498#   508#   525#   541#   546#   555#   583#
                     749#   765#   769#   785#   789#   805#   809#   825#   829#   837#   841#   849#   853#
                     861#  1100#  1102#  1114#  1151#  1161#  1182#  1198#  1200#  1216#  1220#  1237#  1241#
                    1258#  1262#  1279#  1283#  1298#  1302#  1319#  1323#  1340#  1344#  1361#  1365#  1386#
                    1390#  1413#  1417#  1426#  1428#  1444#  1448#  1465#  1470#  1487#  1491#  1508#  1512#
                    1529#  1532#  1549#  1552#  1569#  1573#  1590#  1594#  1615#  1619#  1642#  1645#  1657#
                    1666#  1694#  1698#  1719#  1726#  1729#  1735#  1750#  1754#  1769#  1797#  1806#  1846#
                    1859#  1943#  1953#  1981#  1992#  1994#  2053#  2058#  2083#  2087#  2097#  2102#  2107#
                    2117#  2126#  2130#  2139#  2143#  2152#  2156#  2165#  2169#  2178#  2235#  2262#  2264#
                    2340#  2345#  2423#  2427#  2502#  2506#  2591#  2595#  2686#  2702#  2713#  2717#  2727#
                    2731#  2741#  2811#  2839#  2868   2887#  2901#  2953   2988#
T$NSK0= 000005       370#   456    466#   477    487#   498    508#   525    541#   546    555#   583    749#
                     765    769#   785    789#   805    809#   825    829#   837    841#   849    853#   861
                    1100#  1102   1114#  1151   1161#  1182   1198#  1417   1426#  1645   1657#  1797   1806#
                    1846   1859#  1981   1992#  2235   2262#  2811   2839#  2868   2887   2901#  2953   2988
T$NSK1= 000011      1200#  1216   1220#  1237   1241#  1258   1262#  1279   1283#  1298   1302#  1319   1323#
                    1340   1344#  1361   1365#  1386   1390#  1413   1428#  1444   1448#  1465   1470#  1487
                    1491#  1508   1512#  1529   1532#  1549   1552#  1569   1573#  1590   1594#  1615   1619#
                    1642   1666#  1694   1698#  1719   1726#  1729   1735#  1750   1754#  1769   1943#  1953
                    1994#  2053   2058#  2083   2087#  2097   2102#  2107   2117#  2126   2130#  2139   2143#
                    2152   2156#  2165   2169#  2178   2264#  2340   2345#  2423   2427#  2502   2506#  2591
                    2595#  2686   2702#  2713   2717#  2727   2731#  2741
T$SAVL = 177777      359#
T$SEGL = 177777      359#
T$SUBN= 000005       359#  1198#  1200#  1220#  1241#  1262#  1283#  1302#  1323#  1344#  1365#  1390#  1426#
                    1428#  1448#  1470#  1491#  1512#  1532#  1552#  1573#  1594#  1619#  1657#  1666#  1698#
                    1806#  1859#  1992#  1994#  2058#  2087#  2102#  2262#  2264#  2345#  2427#  2506#  2595#
T$TAGL = 177777      359#
T$TAGN= 010000       359#   487#   508#   749#   769#   789#   809#   829#   841#   853#  1100#  1114#  1161#
                    1198#  1200#  1220#  1241#  1262#  1283#  1302#  1323#  1344#  1365#  1390#  1426#  1428#
                    1448#  1470#  1491#  1512#  1532#  1552#  1573#  1594#  1619#  1657#  1666#  1698#  1726#
                    1735#  1754#  1806#  1859#  1943#  1992#  1994#  2058#  2087#  2102#  2117#  2130#  2143#
                    2156#  2169#  2262#  2264#  2345#  2427#  2506#  2595#  2702#  2717#  2731#  2839#  2901#
T$TEMP= 000005       456#   469#   470#   471#   472#   473#   474#   475#   476#   477#   498#   525#   546#
                     583#   765#   785#   805#   825#   837#   849#   861#   927#  1102#  1137#  1138   1151#
                    1176#  1177   1182#  1211#  1212   1216#  1232#  1233   1237#  1253#  1254   1258#  1274#
                    1275   1279#  1293#  1294   1298#  1314#  1315   1319#  1335#  1336   1340#  1356#  1357
                    1361#  1381#  1382   1386#  1408#  1409   1413#  1417#  1439#  1440   1444#  1460#  1461
                    1465#  1482#  1483   1487#  1503#  1504   1508#  1524#  1525   1529#  1544#  1545   1549#
                    1564#  1565   1569#  1585#  1586   1590#  1610#  1611   1615#  1637#  1638   1642#  1645#
```

```
                    1663#  1664   1694#  1719#  1722#  1723   1729#  1750#  1769#  1797#  1822#  1823   1842#
                    1843   1846#  1873#  1874   1935#  1936   1953#  1981#  2005#  2017#  2037#  2038   2053#
                    2067#  2068   2083#  2097#  2107#  2111#  2112   2126#  2139#  2152#  2165#  2178#  2235#
                    2287#  2297#  2307#  2318#  2329#  2337#  2338   2340#  2354#  2365#  2402#  2403   2423#
                    2436#  2447#  2502#  2512#  2526#  2537#  2570#  2571   2591#  2601#  2615#  2626#  2659#
                    2660   2667#  2668   2675#  2676   2683#  2684   2686#  2690#  2691   2713#  2727#  2741#
                    2811#  2843#  2849#  2855#  2861#  2868#  2887#  2904#  2910#  2916#  2922#  2928#  2934#
                    2940#  2946#  2953#  2988#
T$TEST= 0000C7       359#  1198#  1200   1220   1241   1262   1283   1302   1323   1344   1365   1390   1426#
                    1428   1448   1470   1491   1512   1532   1552   1573   1594   1619   1657#  1666   1698
                    1806#  1859#  1992#  1994   2058   2087   2102   2262#  2264   2345   2427   2506   2595
T$TSTM= 177777       359#   754    762    766    774    782    786    794    802    806    814    822    826
                     834    838    846    850    858    862    872    921    924    977    981   1103   1117
                    1124   1126   1133   1137   1152   1173   1176   1183   1200   1206   1211   1214   1217
                    1220   1227   1232   1235   1238   1241   1248   1253   1256   1259   1262   1269   1274
                    1277   1280   1283   1288   1293   1296   1299   1302   1309   1314   1317   1320   1323
                    1330   1335   1338   1341   1344   1351   1356   1359   1362   1365   1376   1381   1384
                    1387   1390   1403   1408   1411   1414   1418   1428   1434   1439   1442   1445   1448
                    1455   1460   1463   1466   1470   1477   1482   1485   1488   1491   1498   1503   1506
                    1509   1512   1519   1524   1527   1530   1532   1539   1544   1547   1550   1552   1559
                    1564   1567   1570   1573   1580   1585   1588   1591   1594   1605   1610   1613   1616
                    1619   1632   1637   1640   1643   1646   1663   1666   1672   1677   1680   1683   1687
                    1691   1695   1698   1702   1705   1708   1712   1716   1720   1722   1740   1747   1751
                    1759   1766   1770   1798   1810   1814   1816   1822   1828   1832   1836   1840   1842
                    1847   1861   1867   1871   1873   1895   1907   1921   1931   1935   1950   1954   1982
                    1994   1996   2002   2014   2033   2037   2040   2047   2051   2054   2058   2063   2067
                    2070   2077   2081   2084   2087   2091   2095   2098   2102   2108   2111   2123   2127
                    2136   2140   2149   2153   2162   2166   2174   2179   2236   2264   2266   2284   2294
                    2304   2315   2326   2337   2341   2345   2351   2362   2402   2405   2411   2417   2424
                    2427   2433   2444   2484   2490   2496   2503   2506   2509   2523   2534   2570   2573
                    2579   2585   2592   2595   2598   2612   2623   2659   2662   2667   2670   2675   2678
                    2683   2687   2690   2708   2714   2722   2728   2736   2742   2812
T$TSTS= 000001       359#  1198#  1426#  1657#  1806#  1859#  1992#  2262#
T$$CLE= 010013      1161#  1176   1182
T$$HAR= 010076      2839#  2868   2888
T$$HW = 010000       487#   498
T$$INI= 010012      1114#  1137   1151
T$$MSG= 010075       749#   765    769#   785    789#   805    809#   825    829#   837    841#   849    853#
                     861    735#   1750   1754#  1769   1943#  1953   2117#  2126   2130#  2139   2143#  2152
                    2156#  2165   2169#  2178   2702#  2713   2717#  2727   2731#  2741
T$$RPT= 010011      1100#  1102
T$$SOF  010077      2901#  2953   2989
T$$SRV= 010045      1726#  1729
T$$SUB= 010072      1200#  1216   1220#  1237   1241#  1258   1262#  1279   1283#  1298   1302#  1319   1323#
                    1340   1344#  1361   1365#  1386   1390#  1413   1428#  1444   1448#  1465   1470#  1487
                    1491#  1508   1512#  1529   1532#  1549   1552#  1569   1573#  1590   1594#  1615   1619#
                    1642   1665#  1694   1698#  1719   1994#  2053   2058#  2083   2087#  2097   2102#  2107
                    2264#  2340   2345#  2402   2423   2427#  2502   2506#  2591   2595#  2686
T$$SW   010001       508#   525
T$$TES= 010065      1198#  1211   1232   1253   1274   1293   1314   1335   1356   1381   1408   1417   1426#
                    1439   1460   1482   1503   1524   1544   1564   1585   1610   1637   1645   1657#  1663
                    1722   1797   1806#  1822   1842   1846   1859#  1873   1935   1981   1992#  2037   2067
                    2111   2235   2262#  2337   2570   2659   2667   2675   2683   2690   2811
.     005260 G       469   1198#
.1    005260        1200#
.0    006006        1390#
```

```
T1.2    005316            1220#
T1.3    005366            1241#
T1.4    005436            1262#
T1.5    005504            1283#
T1.6    005542            1302#
T1.7    005612            1323#
T1.8    005660            1344#
T1.9    005726            1365#
T2      006100 G           470    1426#
T2.1    006100            1428#
T2.10   006636            1619#
T2.2    006136            1448#
T2.3    006206            1470#
T2.4    006256            1491#
T2.5    006324            1512#
T2.6    006372            1532#
T2.7    006442            1552#
T2.8    006510            1573#
T2.9    006556            1594#
T3      006730 G           471    1657#
T3.1    006742            1666#
T3.2    007050            1698#
T4      007462 G           472    1806#
T5      007622 G           473    1859#
T6      010376 G           474    1992#
T6.1    010376            1994#
T6.2    010614            2058#
T6.3    010710            2087#
T6.4    010732            2102#
T7      011526 G           475    2262#
T7.1    011526            2264#
T7.2    011766            2345#
T7.3    012314            2427#
T7.4    012634            2506#
T7.5    013172            2595#
ULIMIT  002210             565#   964*   966    968    970*   973*   974
UNIT    014404            2844   2870#
UNIT.D  015152 G          2996#*
UNI.MA  022030            2996#*
USER.P  015414 G          2996#*
USER.T  015416 G          2996#*
VALID.  015654            2996#
VAL.LA  016474            2996#
VAL.SW  022140            2996#
VECT    002214             567#  1119*  1172   1670
VIPRI   004102             866#  2711   2725   2739
VIRMSG  003457             723#   869
VIRTAD  004356             963#  2176   2385   2467   2557   2646   2710   2724   2738
WIDTH   031422            2996#
WORDCT  002222             570#   934*  2347*  2429*  2519*  2608*
XEQDIA  044444 G          2996#
XEQSUB  044432 G          2996#
XEQ.CL  024154            2996#
XEQ.CM  021464            2996#
XEQ.IN  023636            2996#
XEQ.LA  017726            2996#
```

```
XEQ.OP  023730          2996#
XEQ.PR  017130          2996#
XEQ.TE  023774          2996#
XTIME   043316 G        2996#
XTIMEN  044142          2996#
XTIMST  043340          2996#*
XXDP.D  021504          2996#
X$ALWA= 000000           359#   2868    2953
X$FALS= 000040           359#
X$OFFS= 000400           359#   2868    2953
X$TRUE= 000020           359#
ZERR    003046           670#    751
$BREG   022200          2996#*
$ENDAD  044416 G        2996#
$SAV2   045462 G        2996#
$SAV3   045476 G        2996#
$SAV4   045514 G        2996#
$SAV5   045534 G        2996#
.     = 045740             2#    579#    580#    581#    595#   1138    1177    1212    1233    1254    1275    1294    1315
                        1336    1357    1382    1409    1440   1461    1483    1504    1525    1545    1565    1586    1611
                        1638    1664    1723    1795#   1823   1843    1874    1936    1979#   2038    2068    2112    2338
                        2403    2571    2660    2668    2676   2684    2691    2868    2953    2984#   2991#   2996#

. ABS.  045740     000


ERRORS DETECTED:  0

DSKZ:CVM8AB,DSKZ:CVM8AB/SOL/CRF:SYM/NL:TOC=CVM8AB/ML,CVM8AB.P11,CVM8AB.SUP
RUN-TIME:  41  38  3 SECONDS
RUN-TIME RATIO: 145/83=1.7
CORE USED:  15K  (29 PAGES)
```