BDV11-AA

BOOTSTRAP DIAGNOSTIC
MD-11-DVM8A-A

EP-DVM8A-A-DL

FICHE 1 OF 1

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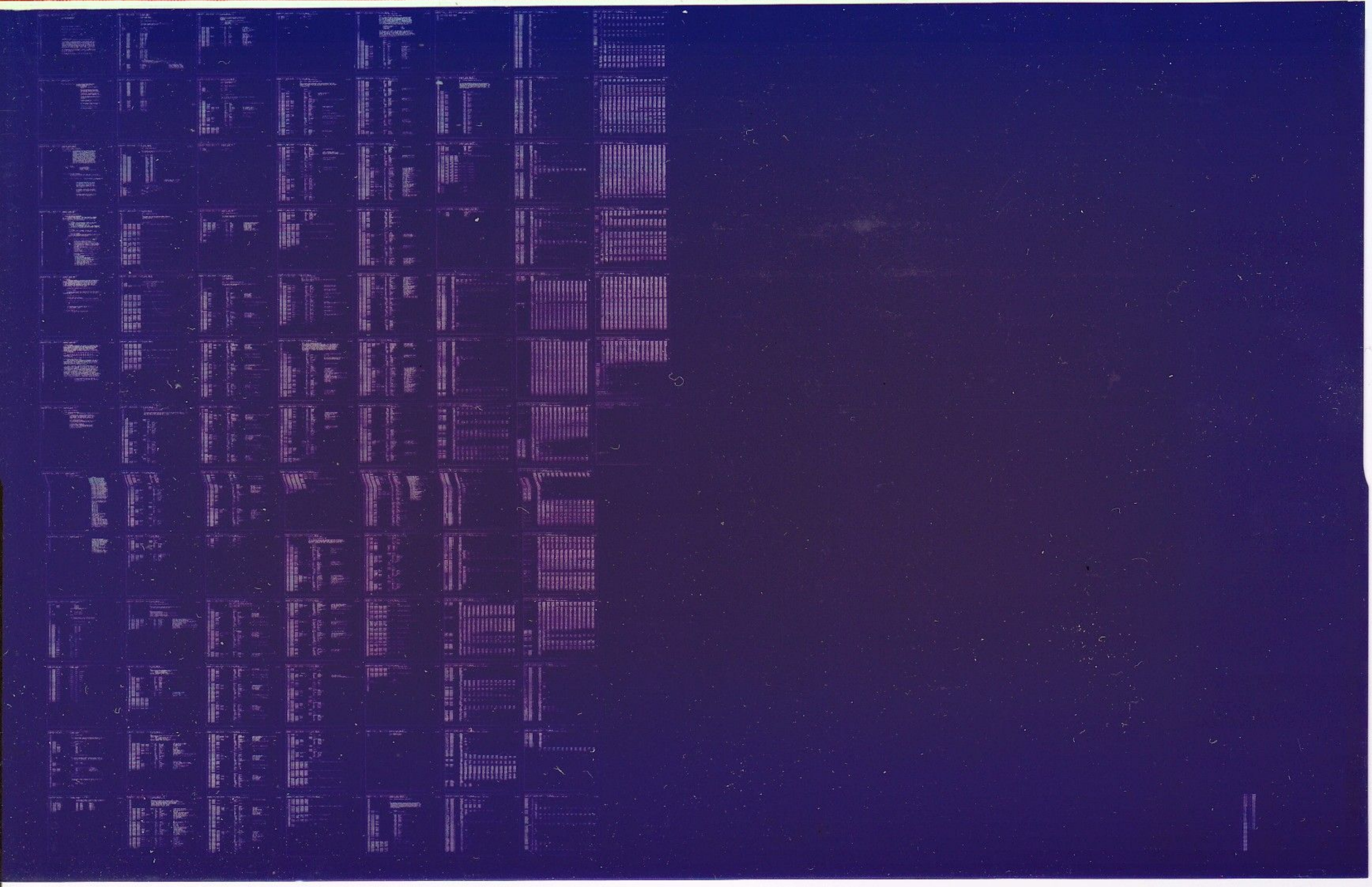

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                        .TITLE USER DOCUMENTATION
                        .SBTTL  IDENTIFICATION




                        ; PRODUCT CODE:  MAINDEC-11-DVM8A-A-D

                        ; PRODUCT NAME:  BDV11-AA BOOTSTRAP DIAGNOSTIC

                        ; MAINTAINER:    COST CENTER 301

                        ; AUTHOR:        MARY MCNALLY    18-AUG-77

                        ;
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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
```

```
                        .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 DVM8AA,
                        ;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
                        ;           DVM8AA 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 DVM8AA".  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
                        ;                       PNT-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.
                                ;           6               1           TO VERIFY THAT THE LOW BYTE
                                ;                                       DIAGNOSTIC ROM HAS GOOD DATA.
                                ;                           2           TO VERIFY THAT THE HIGH BYTE
                                ;                                       DIAGNKOSTIC ROM HAS GOOD DATA.
                                ;                           3           TO INSURE THAT THE DIAGNOSTIC
                                ;                           4           ROMS HAVE NOT BEEN INTERCHANGED.
                                ;           7               1           TO DETERMINE IF THERE IS ANY
                                ;                                       ADDITIONAL MEMORY TO TEST.
                                ;                                       THIS INFORMATION IS OBTAINED
```

```
                                                                J  1

342                             ;                                       THROUGH USER DIALOGUE.
343                             ;                               2       TO TEST THE EXPANDED DIAGNOSTIC
344                             ;                                       ROM. FIRST THE REQUIRED CHECK-
345                             ;                                       WORDS MUST BE INPUT, AND THE
346                             ;                                       STARTING LOCATION IN MEMORY.
347                             ;                                       CHECKSUMS AND CHECKWORD
348                             ;                                       VERIFICATION CONFIRMS GOOD
349                             ;                                       DATA IN ROMS.
350                             ;                               3       TO TEST THE EPROM IN THE
351                             ;                                       SOCKETS.  TEST PROCEDURE IS AS
352                             ;                                       IN SUBTEST 2.
353                             ;                               4       TO TEST SYSTEM ROM.  SAME
354                             ;                                       TEST PROCEDURE AS IN SUBTEST 2.
355                             ;                               5       TO TEST SYSTEM EPROM.  SAME
356                             ;                                       TEST PROCEDURE AS IN SUBTEST 2.
357
```

```
                                        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  DVM8AA,A,0,5
                                L$NAME::
                                        .ASCII  @D@
                                        .ASCII  @V@
                                        .ASCII  @M@
                                        .ASCII  @8@
                                        .ASCII  @A@
                                        .ASCII  @A@
                                        .BYTE   0
                                        .BYTE   0
                                L$REV::
                                        .ASCII  @A@
                                L$DEPO::
                                        .ASCII  @0@
                                L$MREV::
                                        .BYTE   C$REVISION
                                        .BYTE   C$EDIT
                                L$UNIT::
                                        .WORD   0
                                L$TIM1::
                                        .WORD   5
                                L$TIMU::
                                        .WORD
                                L$TIML::
                                        .WORD
                                L$EF::
                                        .WORD   0
                                        .WORD   0
                                L$SPC::
                                        .WORD   0
                                L$EXP1::
                                        .WORD   0
                                L$EXP2::
                                        .WORD   0
                                L$EXP3::
```

```
  414  002036  000000                    .WORD   0
  415  002040                  L$DTP::
  416  002040  002102                    .WORD   L$DISPATCH
  417  002042                  L$ICP::
  418  002042  005024                    .WORD   L$INIT
  419  002044                  L$CCP::
  420  002044  005170                    .WORD   L$CLEAN
  421  002046                  L$HPCP::
  422  002046  014322                    .WORD   L$HARD
  423  002050                  L$SPCP::
  424  002050  014512                    .WORD   L$SOFT
  425  002052                  L$DEVP::
  426  002052  003026                    .WORD   L$DVTYP
  427  002054                  L$REPP::
  428  002054  000000                    .WORD   0
  429  002056                  L$HPTP::
  430  002056  002122                    .WORD   L$HW
  431  002060                  L$SPTP::
  432  002060  002134                    .WORD   L$SW
  433  002062                  L$DRCT::
  434  002062  002476                    .WORD   L$DR
  435  002064                  L$DRS::
  436  002064  002502                    .WORD   L$DRST
  437  002066                  L$STA::
  438  002066  000000                    .WORD   0
  439  002070                  L$AUT::
  440  002070  000000                    .WORD   0
  441  002072                  L$DUT::
  442  002072  000000                    .WORD   0
  443  002074                  L$TSTID::
  444  002074  000000                    .WORD   0
  445  002076                  L$LADP::
  446  002076  015054                    .WORD   L$LAST
  447  002100                            ENDMOD
  448
```

```
                                .SBTTL  DISPATCH TABLE

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

002100                                  BGNMOD  DSPCODE
002100                          DSPCODE::
002100                                  DISPATCH 7
002100  000007                          .WORD   7
002102                          L$DISPATCH::
002102  005250                          .WORD   T1
002104  006070                          .WORD   T2
002106  006720                          .WORD   T3
002110  007452                          .WORD   T4
002112  007612                          .WORD   T5
002114  010366                          .WORD   T6
002116  011516                          .WORD   T7
002120                                  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.
                                ;--

002120                                  BGNHW   DFPTBL
002120  000004                          .WORD   L10000-L$HW/2
002122                          L$HW::
002122                          DFPTBL::

                                        ;DEFAULT VALUES FOR UP TO SIX UNITS
002122  000000                          .WORD   0               ;UNIT NUMBER 0
002124  000100                          .WORD   100             ;INTERRUPT VECTOR
002126  000007                          .WORD   7               ;PRIORITY LEVEL
002130  007777                          .WORD   7777            ;ROCKER SWITCH SETTINGS

002132                                  ENDHW
002132                          L10000:

                                .SBTTL  SOFTWARE P-TABLE

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

002132                                  BGNSW   SFPTBL
002132  000010                          .WORD   L10001-L$SW/2
002134                          L$SW::
002134                          SFPTBL::
```

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

002134  031547                          .WORD   31547           ;PAGE 0,1
002136  014036                          .WORD   14036           ;PAGE 2,3
002140  065162                          .WORD   65162           ;PAGE 4,5
002142  124632                          .WORD   124632          ;PAGE 6,7
002144  032040                          .WORD   32040           ;PAGE 10,11
002146  167124                          .WORD   167124          ;PAGE 12,13
002150  155461                          .WORD   155461          ;PAGE 14,15
002152  032257                          .WORD   32257           ;PAGE 16,17
002154                                  ENDSW
002154                          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.
                                ;--

002154                                  BGNMOD  GLBEQAT
002154                          GLBEQAT::
002154                                  EQUALS
                                ;
                                ; BIT DIFINITIONS
                                ;
        100000                  BIT15== 100000
        040000                  BIT14== 40000
        020000                  BIT13== 20000
        010000                  BIT12== 10000
        004000                  BIT11== 4000
        002000                  BIT10== 2000
        001000                  BIT09== 1000
        000400                  BIT08== 400
        000200                  BIT07== 200
        000100                  BIT06== 100
        000040                  BIT05== 40
        000020                  BIT04== 20
        000010                  BIT03== 10
        000004                  BIT02== 4
        000002                  BIT01== 2
        000001                  BIT00== 1
                                ;
        001000                  BIT9==  BIT09
        000400                  BIT8==  BIT08
        000200                  BIT7==  BIT07
        000100                  BIT6==  BIT06
        000040                  BIT5==  BIT05
        000020                  BIT4==  BIT04
        000010                  BIT3==  BIT03
        000004                  BIT2==  BIT02
        000002                  BIT1==  BIT01
        000001                  BIT0==  BIT00
                                ;
                                ; EVENT FLAG DEFINITIONS
                                ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
                                ;   EF16:EF01 AVAILABLE FOR PROGRAM USE
                                ;
        000040                  EF.START==      32.                     ; START COMMAND WAS ISSUED
        000037                  EF.RESTART==    31.                     ; RESTART COMMAND WAS ISSUED
        000036                  EF.CONTINUE==   30.                     ; CONTINUE COMMAND WAS ISSUED
        000035                  EF.NEW==        29.                     ; A NEW PASS HAS BEEN STARTED
        000034                  EF.PWR==        28.                     ; A POWER-FAIL/POWER-UP OCCURRED

        000020                  EF16==  16.
```

```
   576          000017                  EF15==  15.
   577          000016                  EF14==  14.
   578          000015                  EF13==  13.
   579          000014                  EF12==  12.
   580          000013                  EF11==  11.
   581          000012                  EF10==  10.
   582          000011                  EF09==  9.
   583          000010                  EF08==  8.
   584          000007                  EF07==  7
   585          000006                  EF06==  6
   586          000005                  EF05==  5
   587          000004                  EF04==  4
   588          000003                  EF03==  3
   589          000002                  EF02==  2
   590          000001                  EF01==  1
   591                                  ;
   592
   593                                  ; PRIORITY LEVEL DEFINITIONS
   594                                  ;
   595          000340                  PRI07== 340
   596          000300                  PRI06== 300
   597          000240                  PRI05== 240
   598          000200                  PRI04== 200
   599          000140                  PRI03== 140
   600          000100                  PRI02== 100
   601          000040                  PRI01== 40
   602          000000                  PRI00== 0
   603
   604               177520             PCR=177520
   605               177524             LSREG=177524
   606  002154                                  ENDMOD
```

```
                        .SBTTL  GLOBAL DATA SECTION

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

002154                          BGNMOD  GLBDAT
002154                  GLBDAT::
002154  000000                  BCF:    .WORD   0
002156  000000                  REAL:   .WORD   0
002160  000000                  LOPAG:  .WORD   0
002162  000000                  COUNTR: .WORD   0
002164  000001                  ANSR:   .WORD   1
002166  000000                  RFLAG:  .WORD   0
002170  000000                  EXPSUM: .WORD   0
002172  000000                  ACTSUM: .WORD   0
002174  000000                  PASS:   .WORD   0
002176  000000                  PASCT:  .WORD   0
002200  000000                  ULIMIT: .WORD   0
002202  000000                  PAGE:   .WORD   0
002204  000100                  VECT:   .WORD   100
002206  000000                  SWSET:  .WORD   0
002210  000000                  STORE:  .WORD   0
002212  000000                  WORDCT: .WORD   0
002214  000000                  PRIOR:  .WORD   0
002216  000000                  CKWD:   .WORD   0
002220  000000                  RESPND: .WORD   0
002222  000001                  RSET:   .WORD   1
002224  000000                  LORANG: .WORD   0
002226  000000                  HIRANG: .WORD   0
002230  000000                  BYTLOC: .WORD   0
002232  000000                  ERRFLG: .WORD   0
002234  000010                  EXPDIA: .BLKW   10              ;EXPANDED DIAG. ROM CHECKWORDS
002254  000010                  EPROM:  .BLKW   10              ;EPROM CHECKWORDS
002274  000100                  SYSROM: .BLKW   100             ;SYSTEM ROM/EPROM CHECKWORDS
002474                          ENDMOD


                        ;.STORAGE FOR DEVICE REGISTERS
                        ;
002474                          DEVREG  4,177777,DEVDAT,REGMSK
002474  000001                  .WORD   1
002476                  LSDR::
002476                  REGMSK::
002476  177777                  .WORD   177777
002500  000004                  .WORD   4
002502                  LSDRST::
002502                  DEVDAT::
002502  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

002512 042522 042101 053457 RWR:    .ASCIZ  "READ/WRITE REGISTER    ADDRESS: 177522"
002520 044522 042524 051040
002526 043505 051511 042524
002534 004522 042101 051104
002542 051505 035123 030440
002550 033467 031065 000062

002556 040520 042507 041440 PACR:   .ASCIZ  /PAGE CONTROL REGISTER  ADDRESS: 177520/
002564 047117 051124 046117
002572 051040 043505 051511
002600 042524 004522 042101
002606 051104 051505 035123
002614 030440 033467 031065
002622 000060

002624 044103 041505 051513 CKERR:  .ASCIZ  /CHECKSUM ERROR/
002632 046525 042440 051122
002640 051117    000

002643    111 041516 051117 CWDERR: .ASCIZ  /INCORRECT CHECKWORD/
002650 042522 052103 041440
002656 042510 045503 047527
002664 042122    000

002667    105 051122 051117 LOBYT:  .ASCIZ  /ERROR OCCURRED IN A LOW BYTE PAGE/
002674 047440 041503 051125
002702 042522 020104 047111
002710 040440 046040 053517
002716 041040 052131 020105
002724 040520 042507    000

002731    105 051122 051117 HIBYT:  .ASCIZ  /ERROR OCCURRED IN A HIGH BYTE PAGE/
002736 047440 041503 051125
002744 042522 020104 047111
002752 040440 044040 043511
002760 020110 054502 042524
002766 050040 043501 000105

002774 052123 051101 020124 LOADR:  .ASCIZ  /START OF MEMORY RANGE (K)/
003002 043117 046440 046505
003010 051117 020131 040522
003016 043516 020105 045450
003024 000051

                        .EVEN
```

```
                                        ;
                                        ; NAMES OF DEVICES SUPPORTED BY PROGRAM
                                        ;
                                                DEVTYP  <BDV11AA>
003026                                  L$DVTYP::
003026  042102  030526  040461                 .ASCIZ  @BDV11AA@
003034  000101
                                                .EVEN


                                        ;
                                        ; FORMAT STATEMENTS USED IN PRINT CALLS
                                        ;


003036  040445  042522  044507  ZERR:    .ASCIZ  /%AREGISTER CANNOT HOLD ALL ZEROES%N/
003044  052123  051105  041440
003052  047101  047516  020124
003060  047510  042114  040440
003066  046114  055040  051105
003074  042517  022523  000116

003102  040445  042522  044507  ONERR:   .ASCIZ  /%AREGISTER CANNOT HOLD ALL ONES%N/
003110  052123  051105  041440
003116  047101  047516  020124
003124  047510  042114  040440
003132  046114  047440  042516
003140  022523  000116

003144  040445  042522  044507  BDDAT:   .ASCIZ  /%AREGISTER CANNOT HOLD GOOD DATA%N/
003152  052123  051105  041440
003160  047101  047516  020124
003166  047510  042114  043440
003174  047517  020104  040504
003202  040524  047045     000

003207     045  051101  043505  BYTINS:  .ASCIZ  /%AREGISTER IS NOT BYTE ADDRESSABLE%N/
003214  051511  042524  020122
003222  051511  047040  052117
003230  041040  052131  020105
003236  042101  051104  051505
003244  040523  046102  022505
003252  000116

003254  040445  042522  044507  ROT1:    .ASCIZ  /%AREGISTER PICKED UP AN EXTRA SET BIT%N/
003262  052123  051105  050040
003270  041511  042513  020104
003276  050125  040440  020116
003304  054105  051124  020101
003312  042523  020124  044502
003320  022524  000116

003324  040445  042522  044507  ROT0:    .ASCIZ  /%AREGISTER PICKED UP AN EXTRA CLEAR BIT%N/
003332  052123  051105  050040
```

```
   770  003340  041511  042513  020104
   771  003346  050125  040440  020116
   772  003354  054105  051124  020101
   773  003362  046103  040505  020122
   774  003370  044502  022524  000116
   775
   776  003376  040445  047125  041101  DIAGER: .ASCIZ  /%AUNABLE TO LOCATE CORRECT MEMORY PAGE%N/
   777  003404  042514  052040  020117
   778  003412  047514  040503  042524
   779  003420  041440  051117  042522
   780  003426  052103  046440  046505
   781  003434  051117  020131  040520
   782  003442  042507  047045     000
   783
   784  003447     045  046501  046505  VIRMSG: .ASCIZ  /%AMEMORY RANGE: %D2%A - %D2%AK%N/
   785  003454  051117  020131  040522
   786  003462  043516  035105  022440
   787  003470  031104  040445  026440
   788  003476  022440  031104  040445
   789  003504  022513  000116
   790
   791  003510  040445  054105  042520  REGDT:  .ASCIZ  /%AEXPECTED: %06%S5%ARECEIVED: %06%N/
   792  003516  052103  042105  020072
   793  003524  047445  022466  032523
   794  003532  040445  042522  042503
   795  003540  053111  042105  020072
   796  003546  047445  022466  000116
   797
   798                                  .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.
                        ;--


003554                  BGNMSG  RERR1
003554                  RERR1::
003554                  PRINTB  #ZERR
003554  012746  003036          MOV     #ZERR,-(SP)
003560  012746  000001          MOV     #1,-(SP)
003564  010600                  MOV     SP,R0
003566  104014                  EMT     C$PNTB
003570  062706  000004          ADD     #4,SP
003574                  PRINTX  #REGDT,R1,R2
003574  010246                  MOV     R2,-(SP)
003576  010146                  MOV     R1,-(SP)
003600  012746  003510          MOV     #REGDT,-(SP)
003604  012746  000003          MOV     #3,-(SP)
003610  010600                  MOV     SP,R0
003612  104015                  EMT     C$PNTX
003614  062706  000010          ADD     #10,SP
003620                  ENDMSG
003620                  L10002:
003620  104023                  EMT     C$MSG

003622                  BGNMSG  RERR2
003622                  RERR2::
003622                  PRINTB  #ONERR
003622  012746  003102          MOV     #ONERR,-(SP)
003626  012746  000001          MOV     #1,-(SP)
003632  010600                  MOV     SP,R0
003634  104014                  EMT     C$PNTB
003636  062706  000004          ADD     #4,SP
003642                  PRINTX  #REGDT,R1,R2
003642  010246                  MOV     R2,-(SP)
003644  010146                  MOV     R1,-(SP)
003646  012746  003510          MOV     #REGDT,-(SP)
003652  012746  000003          MOV     #3,-(SP)
003656  010600                  MOV     SP,R0
003660  104015                  EMT     C$PNTX
003662  062706  000010          ADD     #10,SP
003666                  ENDMSG
003666                  L10003:
003666  104023                  EMT     C$MSG

003670                  BGNMSG  RERR3
003670                  RERR3::
003670                  PRINTB  #BDDAT
003670  012746  003144          MOV     #BDDAT,-(SP)
003674  012746  000001          MOV     #1,-(SP)
003700  010600                  MOV     SP,R0
```

```
855  003702  104014                      EMT     C$PNTB
856  003704  062706  000004              ADD     #4,SP
857  003710                      PRINTX  #REGDT,R1,R2
858  003710  010246                      MOV     R2,-(SP)
859  003712  010146                      MOV     R1,-(SP)
860  003714  012746  003510              MOV     #REGDT,-(SP)
861  003720  012746  000003              MOV     #3,-(SP)
862  003724  010600                      MOV     SP,R0
863  003726  104015                      EMT     C$PNTX
864  003730  062706  000010              ADD     #10,SP
865  003734                      ENDMSG
866  003734                      L10004:
867  003734  104023                      EMT     C$MSG
868
869  003736                      BGNMSG  RERR4
870  003736                      RERR4::
871  003736                      PRINTB  #BYTINS
872  003736  012746  003207              MOV     #BYTINS,-(SP)
873  003742  012746  000001              MOV     #1,-(SP)
874  003746  010600                      MOV     SP,R0
875  003750  104014                      EMT     C$PNTB
876  003752  062706  000004              ADD     #4,SP
877  003756                      PRINTX  #REGDT,R1,R2
878  003756  010246                      MOV     R2,-(SP)
879  003760  010146                      MOV     R1,-(SP)
880  003762  012746  003510              MOV     #REGDT,-(SP)
881  003766  012746  000003              MOV     #3,-(SP)
882  003772  010600                      MOV     SP,R0
883  003774  104015                      EMT     C$PNTX
884  003776  062706  000010              ADD     #10,SP
885  004002                      ENDMSG
886  004002                      L10005:
887  004002  104023                      EMT     C$MSG
888
889  004004                      BGNMSG  RERR5
890  004004                      RERR5::
891  004004                      PRINTB  #ROT1
892  004004  012746  003254              MOV     #ROT1,-(SP)
893  004010  012746  000001              MOV     #1,-(SP)
894  004014  010600                      MOV     SP,R0
895  004016  104014                      EMT     C$PNTB
896  004020  062706  000004              ADD     #4,SP
897  004024                      ENDMSG
898  004024                      L10006:
899  004024  104023                      EMT     C$MSG
900
901  004026                      BGNMSG  RERR6
902  004026                      RERR6::
903  004026                      PRINTB  #ROT0
904  004026  012746  003324              MOV     #ROT0,-(SP)
905  004032  012746  000001              MOV     #1,-(SP)
906  004036  010600                      MOV     SP,R0
907  004040  104014                      EMT     C$PNTB
908  004042  062706  000004              ADD     #4,SP
909  004046                      ENDMSG
910  004046                      L10007:
```

```
   911  004046  104023                          EMT     C$MSG
   912
   913  004050                          BGNMSG  PAGERR
   914  004050                          PAGERR.:
   915  004050                          PRINTB  #DIAGER
   916  004050  012746  003376                  MOV     #DIAGER,-(SP)
   917  004054  012746  000001                  MOV     #1,-(SP)
   918  004060  010600                          MOV     SP,R0
   919  004062  104014                          EMT     C$PNTB
   920  004064  062706  000004                  ADD     #4,SP
   921  004070                          ENDMSG
   922  004070                          L10010:
   923  004070  104023                          EMT     C$MSG
   924
   925
   926
   927  004072                          VIPR1:  PRINTF  #VIRMSG,LORANG,HIRANG
   928  004072  013746  002226                  MOV     HIRANG,-(SP)
   929  004076  013746  002224                  MOV     LORANG,-(SP)
   930  004102  012746  003447                  MOV     #VIRMSG,-(SP)
   931  004106  012746  000003                  MOV     #3,-(SP)
   932  004112  010600                          MOV     SP,R0
   933  004114  104017                          EMT     C$PNTF
   934  004116  062706  000010                  ADD     #10,SP
   935
   936                                          EVEN
   937
   938
   939
   940
   941
```

```
                        .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
                        ;--

004122  012701  173776  CHKSUM:  MOV     #173776,R1      ;STORE THE HIGHEST ADDRESS IN THE ROM
004126  063701  002154          ADD     BCF,R1          ;FOR EITHER LOW OR HIGH BYTES
004132  005037  002172          CLR     ACTSUM          ;CLEAR LOCATION WHICH WILL HOLD THE CHECKSUM
004136  012702  173000          MOV     #173000,R2      ;COMPUTE THE LOWEST ADDRESS IN THE ROM
004142  063702  002154          ADD     BCF,R2          ;WHERE THE DATA WILL START
004146  111204          1$:     MOVB    (R2),R4         ;GET DATA IN BYTES
004150  060437  002172          ADD     R4,ACTSUM       ;ADD CONTENTS OF EACH LOCATION TO THE CHECKSUM
004154  062702  000002          ADD     #2,R2           ;ADJUST ADDRESS
004160  020201                  CMP     R2,R1           ;COMPARE CURRENT ADDRESS WITH HIGHEST ADDRESS
004162  002771                  BLT     1$              ;BR IF LESS THAN
004164  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
                        ;--

004166                  INPUT:  PRINTF  #INSTR                  ;PRINT INSTRUCTIONS
004166  012746  004244          MOV     #INSTR,-(SP)
004172  012746  000001          MOV     #1,-(SP)
004176  010600                  MOV     SP,R0
004200  104017                  EMT     C$PNTF
004202  062706  000004          ADD     #4,SP
004206                  INLP:   GMANID  INWORD,STORE,0,-1,0,177777,NO
004206  104043                  EMT     C$GMAN
004210  000406                  BR      10000$
004212  002210                  .WORD   STORE
004214  000022                  .WORD   T$CODE
004216  004332                  .WORD   INWORD
004220  177777                  .WORD   -1
004222  000000                  .WORD   T$LOLIM
004224  177777                  .WORD   T$HILIM
004226                  10000$:
004226  013722  002210          MOV     STORE,(R2)+             ;PUT CHECKWORD IN TABLE
004232  005337  002212          DEC     WORDCT                  ;DECREMENT WORD COUNT
004236  001401                  BEQ     1$                      ;BR IF FINISHED
004240  000762                  BR      INLP                    ;LOOP UNTIL TABLE IS COMPLETE
004242  000207          1$:     RTS     PC                      ;RETURN

004244  040445  054524  042520  INSTR:  .ASCIZ  /%ATYPE IN THE CHECKWORDS AS LISTED IN THE PRINT SET%N/
004252  044440  020116  044124
004260  020105  044103  041505
004266  053513  051117  051504
004274  040440  020123  044514
004302  052123  042105  044440
004310  020116  044124  020105
004316  051120  047111  020124
004324  042523  022524  000116

004332  044103  041505  053513  INWORD: .ASCIZ  /CHECKWORD. /
004340  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
                                        ;--

004346  005001                  VIRTAD:  CLR     R1                     ;START AT BOTTOM OF RANGE
004350  012737  000007  002200           MOV     #7,ULIMIT              ;SET UPPER LIMIT OF PAGE
004356  113737  177520  002202           MOVB    PCR,PAGE               ;LOW PAGE ERROR
004364  023737  002202  002200  LPADD:   CMP     PAGE,ULIMIT            ;IS PAGE <=ULIMIT
004372  003427                           BLE     OUTPUT                 ;BR IF YES
004374  022737  000057  002200           CMP     #57,ULIMIT             ;IS ULIMIT = 57
004402  001006                           BNE     1$                     ;BR IF NO
004404  012737  000207  002200           MOV     #207,ULIMIT            ;CHANGE UPPER LIMIT
004412  012701  000020                   MOV     #20,R1                 ;ADJUST MEMORY POINTER
004416  000762                           BR      LPADD                  ;CHECK PAGE AGAIN
004420  062737  000010  002200  1$:      ADD     #10,ULIMIT             ;INCREASE UPPER LIMIT
004426  022737  000377  002200           CMP     #377,ULIMIT            ;HAS THE UPPER LIMIT EXCEEDED THE MAX. PAGE
004434  002003                           BGE     2$                     ;BR IF NO
004436                                   ERRDF   40.,PAGERR             ;COULD NOT FIND THE PAGE OF MEMORY
004436  104442                           TRAP    T$ERCODE
004440  000050                           .WORD   40
004442  004050                           .WORD   PAGERR
004444                           2$:     CKLOOP
004444  104006                           EMT     C$CLP1
004446  005201                           INC     R1                     ;ADJUST POINTER
004450  000745                           BR      LPADD                  ;LOOP UNTIL UPPER LIMIT IS FOUND
004452  010137  002224          OUTPUT:  MOV     R1,LORANG              ;PULL THE LOW RANGE OUT OF THE TABLE
004456  013737  002224  002226          MOV     LORANG,HIRANG          ;COPY THE DATA
004464  005237  002226                   INC     HIRANG                 ;INCREMENT TO OBTAIN 1K RANGE
004470  005737  002166                   TST     RFLAG                  ;IS IT ROM (2K SEGMENTS)
004474  001402                           BEQ     3$                     ;BR IF NO
004476  005237  002226                   INC     HIRANG                 ;OBTAIN 2K RANGE
004502  000207                   3$:     RTS     PC                     ;RETURN
```

```
1053                                    ;++
1054                                    ;SUBROUTINE TO VERIFY THE CHECKSUM VALUE OF A PAGE
1055                                    ;OF EXISTENT MEMORY AND ALSO TEST FOR THE PROPER CHECKWORD.
1056                                    ;INPUTS: PAGE CONTROL REGISTER, PAGE CHECKWORD.
1057                                    ;OUTPUTS: ERROR FLAGS WHICH POINT TO THE PROPER ERROR MESSAGE
1058                                    ;SUBORDINATE ROUTINES USED: CHKSUM
1059                                    ;CALLING SEQUENCE: JSR  PC,MEMTST
1060                                    ;--
1061
1062  004504  005037  002156        MEMTST: CLR     REAL            ;CLEAR MEMORY INDICATOR
1063  004510  005037  002154        LOBYTE: CLR     BCF             ;SIGNAL LOW BYTES ARE BEING CHECKED
1064  004514  122737  177777  173774       CMPB    #-1,@#173774    ;DOES THE ROM EXIST
1065  004522  001421                       BEQ     HIBYTE          ;BR IF NO
1066  004524  005237  002156               INC     REAL            ;INDICATE THAT MEMORY EXISTS
1067  004530  004737  004122               JSR     PC,CHKSUM       ;COMPUTE THE ACTUAL CHECKSUM
1068  004534  113737  173776  002170       MOVB    @#173776,EXPSUM ;GET THE STORED CHECKSUM
1069  004542  063737  002172  002170       ADD     ACTSUM,EXPSUM   ;ADD THE EXPECTED AND ACTUAL CHECKSUMS
1070  004550  105737  002170               TSTB    EXPSUM          ;TEST RESULTING CHECKBYTE
1071  004554  001404                       BEQ     1$              ;BR IF NO ERROR
1072  004556  012737  000001  002232       MOV     #1,ERRFLG       ;SET CHECHSUM ERROR FLAG
1073  004564  000207                       RTS     PC              ;RETURN
1074  004566                          1$:
1075
1076  004566  012737  000001  002154  HIBYTE: MOV     #1,BCF          ;SET BCF TO DENOTE HIGH BYTES
1077  004574  122737  177777  173775       CMPB    #-1,@#173775    ;DOES THE ROM EXIST
1078  004602  001427                       BEQ     TSTCKW          ;BR IF NO
1079  004604  005737  002156               TST     REAL            ;WAS THERE A LOW ROM?
1080  004610  001003                       BNE     2$              ;BR IF YES
1081  004612  005037  002156               CLR     REAL            ;DENOTE NON-EXISTENT LOW ROM
1082  004616  000207                       RTS     PC              ;RETURN FOR ERROR MESSAGE
1083  004620  005237  002156          2$:  INC     REAL            ;INDICATE MEMORY EXISTS
1084  004624  004737  004122               JSR     PC,CHKSUM       ;COMPUTE CHECKSUM
1085  004630  113737  173777  002170       MOVB    @#173777,EXPSUM ;GET EXPECTED CHECKSUM
1086  004636  063737  002172  002170       ADD     ACTSUM,EXPSUM   ;ADD THE EXPECTED AND ACTUAL CHECKSUMS
1087  004644  105737  002170               TSTB    EXPSUM          ;TEST RESULTING CHECKBYTE
1088  004650  001404                       BEQ     TSTCKW          ;BR IF EQUAL
1089  004652  012737  000001  002232       MOV     #1,ERRFLG       ;SET CHECKSUM ERROR FLAG
1090  004660  000207                       RTS     PC              ;RETURN
1091
1092  004662  005737  002156        TSTCKW: TST     REAL            ;ANY MEMORY?
1093  004666  001420                       BEQ     5$              ;BR IF NO
1094  004670  022737  000001  002156       CMP     #1,REAL         ;SINGLE ROM?
1095  004676  001005                       BNE     3$              ;BR IF NO
1096  004700  123737  002216  173776       CMPB    CKWD,@#173776   ;COMPARE CHECKBYTE ONLY
1097  004706  001005                       BNE     4$              ;BR IF ERROR
1098  004710  000207                       RTS     PC              ;RETURN -- NO ERROR
1099  004712  023737  002216  173776  3$:  CMP     CKWD,@#173776   ;COMPARE CHECKWORD
1100  004720  001403                       BEQ     5$              ;BR IF NO ERROR
1101  004722  012737  000002  002232  4$:  MOV     #2,ERRFLG       ;DENOTE CHECKSUM ERROR
1102  004730  000207                  5$:  RTS     PC              ;RETURN
1103
```

```
                                        ;++
                                        ;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
                                        ;--

004732  013701  002210        SETADR: MOV     STORE,R1        ;COPY DATA
004736  020127  000005                CMP     R1,#5           ;IS THE NUMBER <=5?
004742  003006                        BGT     1$              ;BR IF NO
004744  000241                        CLC                     ;CLEAR C-BIT FOR ROTATE
004746  006101                        ROL     R1              ;ROTATE TO MULTIPLY
004750  006101                        ROL     R1              ;  BY 10 (8)
004752  006101                        ROL     R1              ;
004754  110104                        MOVB    R1,R4           ;COPY DATA
004756  000413                        BR      LOAD            ;LOAD THE PCR
004760  012704  000020        1$:     MOV     #20,R4          ;START WITH 16 (10)
004764  012705  000200                MOV     #200,R5         ;CORRESPONDIGE PAGE IS 200
004770  020104                LOOP:   CMP     R1,R4           ;PAGE FOUND?
004772  001404                        BEQ     2$              ;BR IF YES
004774  005204                        INC     R4              ;NEXT PAGE
004776  062705  000010                ADD     #10,R5          ;NEXT PAGE
005002  000772                        BR      LOOP            ;LOOP UNTIL PAGE IS FOUND
005004  010504                2$:     MOV     R5,R4           ;GET PAGE FOR PCR
005006  110437  002160        LOAD:   MOVB    R4,LOPAG        ;LOW STARTING PAGE
005012  005204                        INC     R4              ;INCREMENT
005014  110437  002161                MOVB    R4,LOPAG+1      ;HIGH STARTING PAGE
005020  000207                        RTS     PC
```

```
                                        .TITLE MISCELLANEOUS SECTIONS
                                        .SBTTL  IDENTIFICATION


                                        .SBTTL  REPORT CODING SECTION

005022                                          BGNRPT
005022                                  L$RPT::
005022                                          ENDRPT
005022                                  L10011:
005022  104025                                  EMT     C$RPT


                                        .SBTTL  INITIALIZE SECTION

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

005024                                          BGNINIT
005024                                  L$INIT::
005024                                          GPHARD  #0,R1                   ;GET POINTER TO BASE ADDRESS OF P-TABLE
005024  012700  000000                          MOV     #0,R0
005030  104042                                  EMT     C$GPHRD
005032  010001                                  MOV     R0,R1
005034  016137  000002  002204                  MOV     2(R1),VECT              ;GET INTERRUPT VECTOR
005042  016137  000004  002214                  MOV     4(R1),PRIOR             ;GET PRIORITY LEVEL
005050  016137  000006  002206                  MOV     6(R1),SWSET             ;GET ROCKER SWITCH SETTINGS
005056                                          SETPRI  #PRI07                  ;INHIBIT INTERRUPTS
005056  012700  000340                          MOV     #PRI07,R0
005062  104041                                  EMT     C$SPRI
005064                                          MANUAL                          ;MANUAL INTERVENTION OK?
005064  104051                                  EMT     C$MANI
005066                                          BNCOMPLETE      OUT             ;BR IF NO
005066  103010                                  BCC     OUT
005070                                          PRINTF  #IDENT                  ;PRINT PROGRAM I.D.
005070  012746  005114                          MOV     #IDENT,-(SP)
005074  012746  000001                          MOV     #1,-(SP)
005100  010600                                  MOV     SP,R0
005102  104017                                  EMT     C$PNTF
005104  062706  000004                          ADD     #4,SP
005110                                  OUT:
005110                                          EXIT    INIT
005110  104032                                  EMT     C$EXIT
005112  000054                                  .WORD   L10012-.

005114  040445  042102  030526  IDENT:  .ASCIZ  "%ABDV11-AA BOOTSTRAP DIAGNOSTIC PROGRAM%N"
005122  026461  040501  041040
005130  047517  051524  051124
005136  050101  042040  040511
005144  047107  051517  044524
005152  020103  051120  043517
005160  040522  022515  000116
                                        .EVEN
```

```
1210
1211  005166                              ENDINIT
1212  005166                        L10012:
1213  005166  104011                       EMT     C$INIT
```

```
1214                                    .SBTTL  CLEANUP CODING SECTION
1215
1216                                    ;++
1217                                    ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
1218                                    ; AT THE END OF EACH PASS.
1219                                    ;--
1220
1221  005170                                    BGNCLN
1222  005170                            L$CLEAN::
1223
1224  005170  005037  177520                    CLR     PCR                 ;CLEAR PAGE CONTROL REGISTER
1225  005174  005037  177522                    CLR     RWREG               ;CLEAR READ/WRITE REGISTER
1226  005200  012737  000001  002222            MOV     #1,RSET             ;RESTORE DEFAULT VALUE
1227  005206  005037  002220                    CLR     RESPND              ;RESTORE DEFAULT
1228  005212  005037  013530                    CLR     ADDON               ;RESTORE DEFAULT
1229  005216  012737  000001  002164            MOV     #1,ANSR             ;RESTORE DEFAULT
1230  005224  005237  002174                    INC     PASS                ;INCREMENT PASS COUNT
1231  005230  005237  002176                    INC     PASCT               ;INCREMENT TEST 4 PASS COUNT
1232  005234                                    CLRVEC  VECT                ;CLEAR INTERRUPT VECTOR
1233  005234  013700  002204                    MOV     VECT,R0
1234  005240  104036                            EMT     C$CVEC
1235
1236  005242                                    EXIT    CLN
1237  005242  104032                            EMT     C$EXIT
1238  005244  000002                            .WORD   L10013-.
1239
1240
1241
1242  005246                                    ENDCLN
1243  005246                            L10013:
1244  005246  104012                            EMT     C$CLEAN
1245
```

```
1246                                    .TITLE HARDWARE TESTS
1247                                    .SBTTL  IDENTIFICATION
1248
1249
1250                                    .SBTTL  TEST 1: READ/WRITE REGISTER TEST
1251                                    ;++
1252                                    ;TEST TO VERIFY THAT THE READ/WRITE REGISTER AT ADDRESS 177522
1253                                    ;IS WORD AND BYTE ADDRESSABLE.
1254                                    ;--
1255
1256            177522                          RWREG=177522
1257
1258   005250                           BGNTST
1259
1260   005250                           BGNSUB
1261   005250   104002                  EMT     C$BSUB
1262   005252   005037   177522        CLR     RWREG                   ;LOAD ALL ZEROS
1263   005256   001411                  BEQ     1$                      ;BR IF CLEAR
1264   005260   005001                  CLR     R1                      ;EXPECTED DATA
1265   005262   013702   177522        MOV     RWREG,R2                ;COPY CONTENTS
1266   005266                           ERRDF   1,RWR,RERR1,CKLOOP      ;REGISTER CANNOT HOLD ALL ZEROS
1267   005266   104562                  TRAP    T$ERCODE
1268   005270   000001                  .WORD   1
1269   005272   002512                  .WORD   RWR
1270   005274   003554                  .WORD   RERR1
1271   005276                           EXIT    TST                     ;ABORT TEST IF LOOP ON ERROR NOT SELECTED
1272   005276   104032                  EMT     C$EXIT
1273   005300   000566                  .WORD   L10014-
1274   005302                   1$:     CKLOOP                          ;LOOP ON ERROR IF SELECTED
1275   005302   104006                  EMT     C$CLP1
1276   005304                           ENDSUB
1277   005304                   L10015:
1278   005304   104003                  EMT     C$ESUB
1279
1280   005306                           BGNSUB
1281   005306   104002                  EMT     C$BSUB
1282   005310   012737   177777 177522  MOV     #-1,RWREG               ;LOAD ALL ONES
1283   005316   022737   177777 177522  CMP     #177777,RWREG           ;CHECK THE REGISTER
1284   005324   001412                  BEQ     2$                      ;BR IF HOLDING GOOD DATA
1285   005326   012701   177777        MOV     #-1,R1                  ;EXPECTED DATA
1286   005332   013702   177522        MOV     RWREG,R2                ;COPY CONTENTS
1287   005336                           ERRDF   2,RWR,RERR2,CKLOOP      ;REGISTER CANNOT HOLD ALL ONES
1288   005336   104562                  TRAP    T$ERCODE
1289   005340   000002                  .WORD   2
1290   005342   002512                  .WORD   RWR
1291   005344   003622                  .WORD   RERR2
1292   005346                           EXIT    TST                     ;ABORT TEST IF ERROR AND NO LOOPING
1293   005346   104032                  EMT     C$EXIT
1294   005350   000516                  .WORD   L10014-
1295   005352                   2$:     CKLOOP                          ;LOOP ON ERROR IF SELECTED
1296   005352   104006                  EMT     C$CLP1
1297   005354                           ENDSUB
1298   005354                   L10016:
1299   005354   104003                  EMT     C$ESUB
1300
1301   005356                           BGNSUB
```

```
1302  005356  104002                          EMT     C$BSUB
1303  005360  012737  125252  177522          MOV     #125252,RWREG           ;LOAD ALTERNATING 1'S AND 0'S BIT PATTERN
1304  005366  022737  125252  177522          CMP     #125252,RWREG           ;CHECK DATA
1305  005374  001412                          BEQ     3$                      ;BR IF GOOD
1306  005376  012701  125252                  MOV     #125252,R1              ;EXPECTED DATA
1307  005402  013702  177522                  MOV     RWREG,R2                ;COPY CONTENTS
1308  005406                                  ERRDF   3,RWR,RERR3,CKLOOP      ;CANNOT HOLD GOOD DATA
1309  005406  104562                          TRAP    T$ERCODE
1310  005410  000003                          .WORD   3
1311  005412  002512                          .WORD   RWR
1312  005414  003670                          .WORD   RERR3
1313  005416                                  EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1314  005416  104032                          EMT     C$EXIT
1315  005420  000446                          .WORD   L10014-.
1316  005422                          3$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
1317  005422  104006                          EMT     C$CLP1
1318  005424                                  ENDSUB
1319  005424                          L10017:
1320  005424  104003                          EMT     C$ESUB
1321
1322  005426                                  BGNSUB
1323  005426  104002                          EMT     C$BSUB
1324  005430  105037  177522                  CLRB    RWREG                   ;CLEAR THE REGISTER'S LOW BYTE
1325  005434  022737  125000  177522          CMP     #125000,RWREG           ;DID IT CLEAR PROPERLY?
1326  005442  001412                          BEQ     4$                      ;BR IF YES
1327  005444  012701  125000                  MOV     #125000,R1              ;EXPECTED DATA
1328  005450  013702  177522                  MOV     RWREG,R2                ;COPY CONTENTS
1329  005454                                  ERRDF   4,RWR,RERR4,CKLOOP      ;DID NOT RESPOND PROPERLY TO BYTE INSTRUCTION
1330  005454  104562                          TRAP    T$ERCODE
1331  005456  000004                          .WORD   4
1332  005460  002512                          .WORD   RWR
1333  005462  003736                          .WORD   RERR4
1334  005464                                  EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1335  005464  104032                          EMT     C$EXIT
1336  005466  000400                          .WORD   L10014-.
1337  005470                          4$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
1338  005470  104006                          EMT     C$CLP1
1339  005472                                  ENDSUB
1340  005472                          L10020:
1341  005472  104003                          EMT     C$ESUB
1342
1343  005474                                  BGNSUB
1344  005474  104002                          EMT     C$BSUB
1345  005476  000337  177522                  SWAB    RWREG                   ;SWAP BYTES IN THE REGISTER
1346  005502  022737  000252  177522          CMP     #252,RWREG              ;GOOD DATA?
1347  005510  001406                          BEQ     5$                      ;BR IF YES
1348  005512                                  ERRDF   5,RWR,RERR4,CKLOOP      ;BYTE INSTRUCTION ERROR
1349  005512  104562                          TRAP    T$ERCODE
1350  005514  000005                          .WORD   5
1351  005516  002512                          .WORD   RWR
1352  005520  003736                          .WORD   RERR4
1353  005522                                  EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1354  005522  104032                          EMT     C$EXIT
1355  005524  000342                          .WORD   L10014-
1356  005526                          5$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
1357  005526  104006                          EMT     C$CLP1
```

```
1358  005530                                        ENDSUB
1359  005530                                L10021:
1360  005530  104003                               EMT     C$ESUB
1361
1362  005532                                        BGNSUB
1363  005532  104002                               EMT     C$BSUB
1364  005534  012737  052525  177522               MOV     #052525,RWREG           ;LOAD AN ALTERNATING 0'S AND 1'S BIT PATTERN
1365  005542  022737  052525  177522               CMP     #052525,RWREG           ;CHECK IT
1366  005550  001412                               BEQ     6$                      ;BR IF GOOD DATA
1367  005552  012701  052525                       MOV     #052525,R1              ;EXPECTED DATA
1368  005556  013702  177522                       MOV     RWREG,R2                ;COPY CONTENTS
1369  005562                                        ERRDF   6,RWR,RERR3,CKLOOP      ;CANNOT HOLD GOOD DATA
1370  005562  104562                               TRAP    T$ERCODE
1371  005564  000006                               .WORD   6
1372  005566  002512                               .WORD   RWR
1373  005570  003670                               .WORD   RERR3
1374  005572                                        EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1375  005572  104032                               EMT     C$EXIT
1376  005574  000272                               .WORD   L10014-.
1377  005576                                6$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
1378  005576  104006                               EMT     C$CLP1
1379  005600                                        ENDSUB
1380  005600                                L10022:
1381  005600  104003                               EMT     C$ESUB
1382
1383  005602                                        BGNSUB
1384  005602  104002                               EMT     C$BSUB
1385  005604  105037  177523                       CLRB    RWREG+1                 ;CLEAR HIGH BYTE OF REGISTER
1386  005610  022737  000125  177522               CMP     #125,RWREG              ;CHECK THE RESULTING CONTENTS OF THE REGISTER
1387  005616  001412                               BEQ     7$                      ;BR IF GOOD DATA
1388  005620  012701  000125                       MOV     #125,R1                 ;EXPECTED DATA
1389  005624  013702  177522                       MOV     RWREG,R2                ;COPY CONTENTS
1390  005630                                        ERRDF   7,RWR,RERR4,CKLOOP      ;BYTE INSTRUCTION ERROR
1391  005630  104562                               TRAP    T$ERCODE
1392  005632  000007                               .WORD   7
1393  005634  002512                               .WORD   RWR
1394  005636  003736                               .WORD   RERR4
1395  005640                                        EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1396  005640  104032                               EMT     C$EXIT
1397  005642  000224                               .WORD   L10014-
1398  005644                                7$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
1399  005644  104006                               EMT     C$CLP1
1400  005646                                        ENDSUB
1401  005646                                L10023:
1402  005646  104003                               EMT     C$ESUB
1403
1404  005650                                        BGNSUB
1405  005650  104002                               EMT     C$BSUB
1406  005652  000337  177522                       SWAB    RWREG                   ;SWAP BYTES
1407  005656  022737  052400  177522               CMP     #052400,RWREG           ;DATA GOOD?
1408  005664  001412                               BEQ     10$                     ;BR IF YES
1409  005666  012701  052400                       MOV     #52400,R1               ;EXPECTED DATA
1410  005672  013702  177522                       MOV     RWREG,R2                ;COPY CONTENTS
1411  005676                                        ERRDF   10,RWR,RERR4,CKLOOP     ;BYTE INSTRUCTION ERROR
1412  005676  104562                               TRAP    T$ERCODE
1413  005700  000012                               .WORD   10
```

```
1414  005702  002512                          .WORD   RWR
1415  005704  003736                          .WORD   RERR4
1416  005706                                  EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1417  005706  104032                          EMT     C$EXIT
1418  005710  000156                          .WORD   L10014-.
1419  005712                          10$:    CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
1420  005712  104006                          EMT     C$CLP1
1421  005714                                  ENDSUB
1422  005714                          L10024:
1423  005714  104003                          EMT     C$ESUB
1424
1425  005716                                  BGNSUB
1426  005716  104002                          EMT     C$BSUB
1427  005720  005037  177522                  CLR     RWREG                   ;MAKE SURE THE C-BIT IS CLEAR
1428  005724  052737  100000  177522          BIS     #BIT15,RWREG            ;SET MSB
1429  005732  013703  177522                  MOV     RWREG,R3                ;COPY DATA IN RWREG
1430  005736  023703  177522          ROTLP1: CMP     RWREG,R3                ;ARE THEY THE SAME?
1431  005742  001005                          BNE     11$                     ;BR IF NO
1432  005744  006003                          ROR     R3                      ;ROTATE THE SET BIT
1433  005746  001411                          BEQ     12$                     ;BR WHEN FINISHED
1434  005750  006037  177522                  ROR     RWREG                   ;REPEAT ROTATE
1435  005754  000770                          BR      ROTLP1                  ;LOOP UNTIL ROTATE IS COMPLETE
1436  005756                          11$:    ERRDF   11,RWR,RERR5,CKLOOP
1437  005756  104562                          TRAP    T$ERCODE
1438  005760  000013                          .WORD   11
1439  005762  002512                          .WORD   RWR
1440  005764  004004                          .WORD   RERR5
1441  005766                                  EXIT    TST                     ;SKIP REST OF TEST
1442  005766  104032                          EMT     C$EXIT
1443  005770  000076                          .WORD   L10014-.
1444  005772                          12$:    CKLOOP                          ;CHECK FOR LOOP ON ERROR
1445  005772  104006                          EMT     C$CLP1
1446  005774                                  ENDSUB
1447  005774                          L10025:
1448  005774  104003                          EMT     C$ESUB
1449
1450  005776                                  BGNSUB
1451  005776  104002                          EMT     C$BSUB
1452  006000  012737  177777  177522          MOV     #-1,RWREG               ;SET ALL ONES
1453  006006  042737  100000  177522          BIC     #BIT15,RWREG            ;CLEAR MSB
1454  006014  013703  177522                  MOV     RWREG,R3                ;COPY DATA
1455  006020  023703  177522          ROTLP2: CMP     RWREG,R3                ;ARE THEY THE SAME?
1456  006024  001010                          BNE     13$                     ;BR IF NO
1457  006026  000261                          SEC                             ;SET C-BIT FOR ROTATE
1458  006030  006037  177522                  ROR     RWREG                   ;ROTATE CLEAR BIT
1459  006034  006003                          ROR     R3                      ;REPEAT
1460  006036  022703  077777                  CMP     #077777,R3              ;FINISHED?
1461  006042  001366                          BNE     ROTLP2                  ;BR IF NOT YET
1462  006044  000406                          BR      14$                     ;SUBTEST FINISHED
1463  006046                          13$:    ERRDF   12,RWR,RERR6,CKLOOP
1464  006046  104562                          TRAP    T$ERCODE
1465  006050  000014                          .WORD   12
1466  006052  002512                          .WORD   RWR
1467  006054  004026                          .WORD   RERR6
1468  006056                                  EXIT TST
1469  006056  104032                          EMT     C$EXIT
```

```
1470  006060  000006                        .WORD   L10014-.
1471  006062                        14$:    CKLOOP
1472  006062  104006                        EMT     C$CLP1
1473  006064                                ENDSUB
1474  006064                        L10026:
1475  006064  104003                        EMT     C$ESUB
1476
1477  006066                                ENDTST
1478  006066                        L10014:
1479  006066  104001                        EMT     C$ETST
```

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

006070                                  BGNTST

006070                                  BGNSUB
006070  104002                          EMT     C$BSUB
006072  005037  177520                  CLR     PCR                     ;LOAD ALL ZEROS
006076  001411                          BEQ     1$                      ;BR IF CLEARED
006100  005001                          CLR     R1                      ;EXPECTED DATA
006102  013702  177520                  MOV     PCR,R2                  ;COPY CONTENTS
006106                                  ERRDF   13,PACR,RERR1,CKLOOP    ;REGISTER CANNOT HOLD ALL ZEROS
006106  104562                          TRAP    T$ERCODE
006110  000015                          .WORD   13
006112  002556                          .WORD   PACR
006114  003554                          .WORD   RERR1
006116                                  EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
006116  104032                          EMT     C$EXIT
006120  000576                          .WORD   L10027-.
006122                          1$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
006122  104006                          EMT     C$CLP1
006124                                  ENDSUB
006124                          L10030:
006124  104003                          EMT     C$ESUB

006126                                  BGNSUB
006126  104002                          EMT     C$BSUB
006130  012737  177777  177520          MOV     #-1,PCR                 ;LOAD ALL ONES
006136  022737  177777  177520          CMP     #177777,PCR             ;CHECK FOR GOOD DATA
006144  001412                          BEQ     2$                      ;BR IF GOOD
006146  012701  177777                  MOV     #-1,R1                  ;EXPECTED DATA
006152  013702  177520                  MOV     PCR,R2                  ;COPY CONTENTS
006156                                  ERRDF   14,PACR,RERR2,CKLOOP    ;REGISTER CANNOT HOLD ALL ONES
006156  104562                          TRAP    T$ERCODE
006160  000016                          .WORD   14
006162  002556                          .WORD   PACR
006164  003622                          .WORD   RERR2
006166                                  EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
006166  104032                          EMT     C$EXIT
006170  000526                          .WORD   L10027-
006172                          2$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
006172  104006                          EMT     C$CLP1
006174                                  ENDSUB
006174                          L10031:
006174  104003                          EMT     C$ESUB

006176                                  BGNSUB
006176  104002                          EMT     C$BSUB
006200  012737  125252  177520          MOV     #125252,PCR             ;LOAD AN ALTERNATING 1'S AND 0'S BIT PATTERN
006206  022737  125252  177520          CMP     #125252,PCR             ;CHECK THE RESULTS
006214  001412                          BEQ     3$                      ;BR IF GOOD DATA
006216  012701  125252                  MOV     #125252,R1              ;EXPECTED DATA
```

```
1536  006222  013702  177520            MOV     PCR,R2                  ;COPY CONTENTS
1537  006226                            ERRDF   15,PACR,RERR3,CKLOOP    ;REGISTER CANNOT HOLD GOOD DATA
1538  006226  104562                    TRAP    T$ERCODE
1539  006230  000017                    .WORD   15
1540  006232  002556                    .WORD   PACR
1541  006234  003670                    .WORD   RERR3
1542  006236                            EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1543  006236  104032                    EMT     C$EXIT
1544  006240  000456                    .WORD   L10027-.
1545  006242                    3$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
1546  006242  104006                    EMT     C$CLP1
1547  006244                            ENDSUB
1548  006244                    L10032:
1549  006244  104003                    EMT     C$ESUB
1550
1551  006246                            BGNSUB
1552  006246  104002                    EMT     C$BSUB
1553  006250  105037  177520            CLRB    PCR                     ;CLEAR THE REGISTER'S LOW BYTE
1554  006254  022737  125000  177520    CMP     #125000,PCR             ;COMPARE THE RESULTS
1555  006262  001412                    BEQ     4$                      ;BR IF GOOD DATA
1556  006264  012701  125000            MOV     #125000,R1              ;EXPECTED DATA
1557  006270  013702  177520            MOV     PCR,R2                  ;COPY CONTENTS
1558  006274                            ERRDF   16,PACR,RERR4,CKLOOP    ;BYTE INSTRUCTION ERROR
1559  006274  104562                    TRAP    T$ERCODE
1560  006276  000020                    .WORD   16
1561  006300  002556                    .WORD   PACR
1562  006302  003736                    .WORD   RERR4
1563  006304                            EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1564  006304  104032                    EMT     C$EXIT
1565  006306  000410                    .WORD   L10027-.
1566  006310                    4$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
1567  006310  104006                    EMT     C$CLP1
1568  006312                            ENDSUB
1569  006312                    L10033:
1570  006312  104003                    EMT     C$ESUB
1571
1572  006314                            BGNSUB
1573  006314  104002                    EMT     C$BSUB
1574  006316  000337  177520            SWAB    PCR                     ;SWAP BYTES
1575  006322  022737  000252  177520    CMP     #252,PCR                ;CHECK THE RESULTS
1576  006330  001412                    BEQ     5$                      ;BR IF GOOD DATA
1577  006332  012701  000252            MOV     #252,R1                 ;EXPECTED DATA
1578  006336  013702  177520            MOV     PCR,R2                  ;COPY CONTENTS
1579  006342                            ERRDF   17,PACR,RERR4,CKLOOP    ;BYTE INSTRUCTION ERROR
1580  006342  104562                    TRAP    T$ERCODE
1581  006344  000021                    .WORD   17
1582  006346  002556                    .WORD   PACR
1583  006350  003736                    .WORD   RERR4
1584  006352                            EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1585  006352  104032                    EMT     C$EXIT
1586  006354  000342                    .WORD   L10027-.
1587  006356                    5$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
1588  006356  104006                    EMT     C$CLP1
1589  006360                            ENDSUB
1590  006360                    L10034:
1591  006360  104003                    EMT     C$ESUB
```

```
1592  006362                                        BGNSUB
1593  006362  104002                                EMT     C$BSUB
1594  006364  012737  052525  177520                MOV     #052525,PCR             ;LOAD AN ALTERNATING 0'S AND 1'S BIT PATTERN
1595  006372  022737  052525  177520                CMP     #052525,PCR             ;CHECK THE RESULTS
1596  006400  001412                                BEQ     6$                      ;BR IF GOOD DATA
1597  006402  012701  052525                        MOV     #052525,R1              ;EXPECTED DATA
1598  006406  013702  177520                        MOV     PCR,R2                  ;COPY CONTENTS
1599  006412                                        ERRDF   20,PACR,RERR3,CKLOOP    ;REGISTER CANNOT HOLD GOOD DATA
1600  006412  104562                                TRAP    T$ERCODE
1601  006414  000024                                .WORD   20
1602  006416  002556                                .WORD   PACR
1603  006420  003670                                .WORD   RERR3
1604  006422                                        EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1605  006422  104032                                EMT     C$EXIT
1606  006424  000272                                .WORD   L10027-.
1607  006426                                6$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
1608  006426  104006                                EMT     C$CLP1
1609  006430                                        ENDSUB
1610  006430                                L10035:
1611  006430  104003                                EMT     C$ESUB
1612  006432                                        BGNSUB
1613  006432  104002                                EMT     C$BSUB
1614  006434  105037  177521                        CLRB    PCR+1                   ;CLEAR THE HIGH BYTE
1615  006440  022737  000125  177520                CMP     #125,PCR                ;CHECK THE REGISTER CONTENTS
1616  006446  001412                                BEQ     7$                      ;BR IF GOOD DATA
1617  006450  012701  000125                        MOV     #125,R1                 ;EXPECTED DATA
1618  006454  013702  177520                        MOV     PCR,R2                  ;COPY CONTENTS
1619  006460                                        ERRDF   21,PACR,RERR4,CKLOOP    ;BYTE INSTRUCTION ERROR
1620  006460  104562                                TRAP    T$ERCODE
1621  006462  000025                                .WORD   21
1622  006464  002556                                .WORD   PACR
1623  006466  003736                                .WORD   RERR4
1624  006470                                        EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1625  006470  104032                                EMT     C$EXIT
1626  006472  000224                                .WORD   L10027-.
1627  006474                                7$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
1628  006474  104006                                EMT     C$CLP1
1629  006476                                        ENDSUB
1630  006476                                L10036:
1631  006476  104003                                EMT     C$ESUB
1632
1633  006500                                        BGNSUB
1634  006500  104002                                EMT     C$BSUB
1635  006502  000337  177520                        SWAB    PCR                     ;SWAP BYTES
1636  006506  022737  052400  177520                CMP     #052400,PCR             ;CHECK RESULTING CONTENTS
1637  006514  001412                                BEQ     10$                     ;BR IF GOOD DATA
1638  006516  012701  052400                        MOV     #52400,R1               ;EXPECTED DATA
1639  006522  013702  177520                        MOV     PCR,R2                  ;COPY CONTENTS
1640  006526                                        ERRDF   22,PACR,RERR4,CKLOOP    ;BYTE INSTRUCTION ERROR
1641  006526  104562                                TRAP    T$ERCODE
1642  006530  000026                                .WORD   22
1643  006532  002556                                .WORD   PACR
1644  006534  003736                                .WORD   RERR4
1645  006536                                        EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
1646  006536  104032                                EMT     C$EXIT
1647  006540  000156                                .WORD   L10027-.
```

```
1648  006542                                  10$:    CKLOOP                          ;CHECK FOR LOOP ON ERROR
1649  006542  104006                                  EMT     C$CLP1
1650  006544                                          ENDSUB
1651  006544                                  L10037:
1652  006544  104003                                  EMT     C$ESUB
1653
1654  006546                                          BGNSUB
1655  006546  104002                                  EMT     C$BSUB
1656  006550  005037  177520                         CLR     PCR                     ;MAKE SURE THE C-BIT IS CLEAR
1657  006554  052737  100000  177520                 BIS     #BIT15,PCR              ;SET MSB
1658  006562  013703  177520                         MOV     PCR,R3                  ;COPY DATA IN PCR
1659  006566  023703  177520          ROTLP3:       CMP     PCR,R3                  ;ARE THEY THE SAME?
1660  006572  001005                                  BNE     11$                     ;BR IF NO
1661  006574  006003                                  ROR     R3                      ;ROTATE THE SET BIT
1662  006576  001411                                  BEQ     12$                     ;BR IF FINISHED
1663  006600  006037  177520                         ROR     PCR                     ;REPEAT ROTATE
1664  006604  000770                                  BR      ROTLP3                  ;LOOP UNTIL ROTATE IS COMPLETE
1665  006606                                  11$:    ERRDF   23,PACR,RERR5,CKLOOP
1666  006606  104562                                  TRAP    T$ERCODE
1667  006610  000027                                  .WORD   23
1668  006612  002556                                  .WORD   PACR
1669  006614  004004                                  .WORD   RERR5
1670  006616                                          EXIT    TST                     ;SKIP REST OF TEST
1671  006616  104032                                  EMT     C$EXIT
1672  006620  000076                                  .WORD   L10027-.
1673  006622                                  12$:    CKLOOP                          ;CHECK FOR LOOP ON ERROR
1674  006622  104006                                  EMT     C$CLP1
1675  006624                                          ENDSUB
1676  006624                                  L10040:
1677  006624  104003                                  EMT     C$ESUB
1678
1679  006626                                          BGNSUB
1680  006626  104002                                  EMT     C$BSUB
1681  006630  012737  177777  177520                 MOV     #-1,PCR                 ;SET ALL ONES
1682  006636  042737  100000  177520                 BIC     #BIT15,PCR              ;CLEAR MSB
1683  006644  013703  177520                         MOV     PCR,R3                  ;COPY DATA
1684  006650  023703  177520          ROTLP4:       CMP     PCR,R3                  ;ARE THEY THE SAME?
1685  006654  001010                                  BNE     13$                     ;BR IF NO
1686  006656  000261                                  SEC                             ;SET C-BIT FOR ROTATE
1687  006660  006037  177520                         ROR     PCR                     ;ROTATE CLEAR BIT
1688  006664  006003                                  ROR     R3                      ;REPEAT
1689  006666  022703  077777                         CMP     #077777,R3              ;ALL ONES?
1690  006672  001366                                  BNE     ROTLP4                  ;BR IF NOT YET
1691  006674  000406                                  BR      14$                     ;SUBTEST FINISHED
1692  006676                                  13$:    ERRDF   24,PACR,RERR6,CKLOOP
1693  006676  104562                                  TRAP    T$ERCODE
1694  006700  000030                                  .WORD   24
1695  006702  002556                                  .WORD   PACR
1696  006704  004026                                  .WORD   RERR6
1697  006706                                          EXIT TST
1698  006706  104032                                  EMT     C$EXIT
1699  006710  000006                                  .WORD   L10027-.
1700  006712                                  14$     CKLOOP
1701  006712  104006                                  EMT     C$CLP1
1702  006714                                          ENDSUB
1703  006714                                  L10041:
```

```
1704  006714  104003                          EMT     C$ESUB
1705  006716                                  ENDTST
1706  006716                          L10027:
1707  006716  104001                          EMT     C$ETST
1708
```

```
                                        .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.
                                        ;--

006720                                          BGNTST

        177546                                  BEVREG=177546

006720  005737  002174                        TST     PASS            ;IF THIS IS FIRST PASS
006724  001402                                BEQ     1$              ;THEN DO THE TEST
006726                                          EXIT    TST             ;ELSE DON'T
006726  104032                                EMT     C$EXIT
006730  000520                                .WORD   L10042-.
006732                                  1$:     BGNSUB
006732  104002                                EMT     C$BSUB
006734                                          SETVEC  VECT,#INTSR,#PRIO7      ;SET INTERRUPT VECTOR, INHIBIT INTERRUPTS
006734  012746  000340                        MOV     #PRIO7,-(SP)
006740  012746  007124                        MOV     #INTSR,-(SP)
006744  013746  002204                        MOV     VECT,-(SP)
006750  012746  000003                        MOV     #3.-(SP)
006754  104037                                EMT     C$SVEC
006756  062706  000010                        ADD     #10,SP
006762  052737  000100  177546                BIS     #BIT06,BEVREG           ;REMOVE BEVENT CLAMP
006770                                          SETPRI  #PRIOO                  ;ALLOW INTERRUPTS
006770  012700  000000                        MOV     #PRIOO,R0
006774  104041                                EMT     C$SPRI
006776                                          WAITUS  #400.                   ;DELAY 40 MSECS.
006776  012700  000620                        MOV     #400.,R0
007002  104027                                EMT     C$WTU
007004                                          SETPRI  #PRIO7                  ;INHIBIT FURTHER INTERRUPTS
007004  012700  000340                        MOV     #PRIO7,R0
007010  104041                                EMT     C$SPRI
007012  022737  000002  007132                CMP     #2,ICOUNT               ;DID THE MINIMUM OF TWO INTERRUPTS OCCUR?
007020  003403                                BLE     2$                      ;BR IF YES
007022                                          ERRDF   25.,BVERR1,CKLOOP       ;BEVENT CLAMP ENABLE FAILED
007022  104542                                TRAP    T$ERCODE
007024  000031                                .WORD   25
007026  007134                                .WORD   BVERR1
007030                                  2$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
007030  104006                                EMT     C$CLP1
007032  005037  007132                        CLR     ICOUNT                  ;CLEAR INTERRUPT COUNT
007036                                          ENDSUB
007036                                  L10043:
007036  104003                                EMT     C$ESUB

007040                                          BGNSUB
007040  104002                                EMT     C$BSUB
007042  042737  000100  177546                BIC     #BIT06,BEVREG           ;SET BEVENT CLAMP
007050                                          SETPRI  #PRIOO                  ;ALLOW INTERRUPTS
007050  012700  000000                        MOV     #PRIOO,R0
007054  104041                                EMT     C$SPRI
007056                                          WAITUS  #400.                   ;DELAY 40 MSECS
```

```
1765  007056  012700  000620                    MOV     #400.,R0
1766  007062  104027                            EMT     C$WTU
1767  007064                                    SETPRI  #PRI07                  ;SET HIGHEST PRIORITY
1768  007064  012700  000340                    MOV     #PRI07,R0
1769  007070  104041                            EMT     C$SPRI
1770  007072  022737  000001  007132            CMP     #1,ICOUNT               ;CHECK INTERRUPT COUNT
1771  007100  002003                            BGE     4$                      ;BR IF NO INTERRUPTS OCCURRED
1772  007102                                    ERRDF   26.,BVERR2,CKLOOP       ;BEVENT CLAMP DID NOT PREVENT INTERRUPTS
1773  007102  104542  .                         TRAP    T$ERCODE
1774  007104  000032                            .WORD   26
1775  007106  007202                            .WORD   BVERR2
1776  007110                            4$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
1777  007110  104006                            EMT     C$CLP1
1778  007112  005037  007132                    CLR     ICOUNT                  ;CLEAR INTERRUPT COUNT
1779  007116                                    ENDSUB
1780  007116                            L10044:
1781  007116  104003                            EMT     C$ESUB
1782  007120                                    EXIT TST
1783  007120  104032                            EMT     C$EXIT
1784  007122  000326                             WORD   L10042-.
1785  007124                            INTSR:
1786  007124                                    BGNSRV  BEVENT                  ;INTERRUPT SERVICE ROUTINE
1787  007124                            BEVENT::
1788  007124  005237  007132                    INC     ICOUNT                  ;INCREMENT COUNTER
1789  007130                                    ENDSRV
1790  007130                            L10045:
1791  007130  000002                            RTI
1792
1793  007132  000000                    ICOUNT: .WORD   0
1794
1795  007134                                    BGNMSG  BVERR1
1796  007134                            BVERR1::
1797  007134                                    PRINTB  #MSG1
1798  007134  012746  007250                    MOV     #MSG1,-(SP)
1799  007140  012746  000001                    MOV     #1,-(SP)
1800  007144  010600                            MOV     SP,R0
1801  007146  104014                            EMT     C$PNTB
1802  007150  062706  000004                    ADD     #4,SP
1803  007154                                    PRINTB  #INTCT,ICOUNT
1804  007154  013746  007132                    MOV     ICOUNT,-(SP)
1805  007160  012746  007324                    MOV     #INTCT,-(SP)
1806  007164  012746  000002                    MOV     #2,-(SP)
1807  007170  010600                            MOV     SP,R0
1808  007172  104014                            EMT     C$PNTB
1809  007174  062706  000006                    ADD     #6,SP
1810  007200                                    ENDMSG
1811  007200                            L10046:
1812  007200  104023                            EMT     C$MSG
1813
1814  007202                                    BGNMSG  BVERR2
1815  007202                            BVERR2::
1816  007202                                    PRINTB  #MSG2
1817  007202  012746  007373                    MOV     #MSG2,-(SP)
1818  007206  012746  000001                    MOV     #1,-(SP)
1819  007212  010600                            MOV     SP,R0
1820  007214  104014                            EMT     C$PNTB
```

```
1821  007216  062706  000004                  ADD     #4,SP
1822  007222                                  PRINTB  #INTCT,ICOUNT
1823  007222  013746  007132                  MOV     ICOUNT,-(SP)
1824  007226  012746  007324                  MOV     #INTCT,-(SP)
1825  007232  012746  000002                  MOV     #2,-(SP)
1826  007236  010600                          MOV     SP,R0
1827  007240  104014                          EMT     C$PNTB
1828  007242  062706  000006                  ADD     #6,SP
1829  007246                                  ENDMSG
1830  007246                          L10047:
1831  007246  104023                          EMT     C$MSG
1832
1833  007250  040445  042502  042526  MSG1:   .ASCIZ  /%ABEVENT CLAMP FAILED TO ALLOW INTERRUPTS%N/
1834  007256  052116  041440  040514
1835  007264  050115  043040  044501
1836  007272  042514  020104  047524
1837  007300  040440  046114  053517
1838  007306  044440  052116  051105
1839  007314  052522  052120  022523
1840  007322  000116
1841  007324  040445  052516  041115  INTCT:  .ASCIZ  /%ANUMBER OF INTERRUPTS RECEIVED: %03%N/
1842  007332  051105  047440  020106
1843  007340  047111  042524  051122
1844  007346  050125  051524  051040
1845  007354  041505  044505  042526
1846  007362  035104  022440  031517
1847  007370  047045     000
1848  007373     045  041101  053105  MSG2:   .ASCIZ  /%ABEVENT CLAMP DID NOT PREVENT INTERRUPTS%N/
1849  007400  047105  020124  046103
1850  007406  046501  020120  044504
1851  007414  020104  047516  020124
1852  007422  051120  053105  047105
1853  007430  020124  047111  042524
1854  007436  051122  050125  051524
1855  007444  047045     000
1856          007450                          .EVEN
1857  007450                                  ENDTST
1858  007450                          L10042:
1859  007450  104001                          EMT     C$ETST
```

```
                                        .SBTTL  TEST 4: LIGHT DISPLAY TEST
                                        ;++
                                        ;TEST TO VERIFY THAT THE FOUR RED LED'S ARE WORKING AND CAN BE
                                        ;TURNED ON INDIVIDUALLY.
                                        ;--

007452                                          BGNTST

007452  005037  177524                        CLR     LSREG                   ;TURN ON ALL FOUR LED'S
007456                                          WAITMS  #2.                     ;DELAY APPROX.  0.2 SEC.
007456  012700  000002                        MOV     #2.,R0
007462  104026                                EMT     C$WTM
007464  012737  000017  177524                MOV     #17,LSREG               ;TURN OFF ALL FOUR LED'S
007472                                          WAITMS  #2.                     ;DELAY APPROX.  0.2 SEC.
007472  012700  000002                        MOV     #2.,R0
007476  104026                                EMT     C$WTM
007500                                          MANUAL                          ;IS MANUAL INTERVENTION ALLOWED?
007500  104051                                EMT     C$MANI
007502                                          BCOMPLETE       2$              ;BR IF YES
007502  103410                                BCS     2$
007504  022737  000030  002176                CMP     #30.,PASCT              ;IS PASS COUNT >= 30?
007512  003402                                BLE     1$                      ;BR IF YES
007514                                          EXIT    TST
007514  104032                                EMT     C$EXIT
007516  000072                                .WORD   L10050-.
007520  005037  002176          1$:           CLR     PASCT                   ;EXIT TEST
007524  012737  000016  177524  2$:           MOV     #16,LSREG               ;TURN ON THE LED CORRESPONDING TO THE LSB
007532                                          WAITMS  #2.                     ;DELAY APPROX.  0.2 SEC.
007532  012700  000002                        MOV     #2.,R0
007536  104026                                EMT     C$WTM
007540  012737  000015  177524                MOV     #15,LSREG               ;TURN ON 2ND LED
007546                                          WAITMS  #2.                     ;DELAY APPROX.  0.2 SEC.
007546  012700  000002                        MOV     #2.,R0
007552  104026                                EMT     C$WTM
007554  012737  000013  177524                MOV     #13,LSREG               ;TURN ON 3RD LED
007562                                          WAITMS  #2.                     ;DELAY APPROX.  0.2 SEC.
007562  012700  000002                        MOV     #2.,R0
007566  104026                                EMT     C$WTM
007570  012737  000007  177524                MOV     #7,LSREG                .TURN ON LED CORRESPONDING TO MSB
007576                                          WAITMS  #2.                     :DELAY APPROX.  0.2 SEC.
007576  012700  000002                        MOV     #2.,R0
007602  104026                                EMT     C$WTM
007604                                          EXIT    TST                     ;EXIT
007604  104032                                EMT     C$EXIT
007606  000002                                .WORD   L10050-.

007610                                          ENDTST
007610                          L10050:
007610  104001                                EMT     C$ETST
```

```
                                        .SBTTL  TEST 5: ROCKER SWITCHES TEST
                                        ;TEST TO CONFIRM THE ROCKER SWITCH SETTINGS.  THIS TEST ASSUMES THAT,
                                        ;IN MANUFACTURING, THE ROCKER SWITCHES ARE ALL IN THE ON POSITION.
                                        ;THIS INCLUDES BOTH E21 AND E15. IN MANUFACTURING, THIS TEST WILL
                                        ;VERIFY THAT ALL SWITCHES CAN BE READ AS ON.  IN OTHER ENVIRONMENTS,
                                        ;THE OPERATOR MAY SPECIFY WHAT THE SWITCH SETTINGS ARE BEFORE
                                        ;THE DIAGNOSTIC IS STARTED (SEE PROGRAM OPTIONS UNDER OPERATING
                                        ;INSTRUCTIONS).  SWITCHES A1-A8 CORRESPOND TO E15 AND SWITCHES
                                        ;B1-B4 TO E21.
007612                                          BGNTST

007612                                          MANUAL                          ;IS MANUAL INTERVENTION ALLOWED?
007612  104051                                  EMT     C$MANI
007614                                          BCOMPLETE       PRTSW           ;BR IF YES
007614  103412                                  BCS     PRTSW
007616  023737  002206  177524                  CMP     SWSET,LSREG             ;ALL SWITCHES SHOULD BE ON AND BITS 0-11 SET
007624  001403                                  BEQ     1$                      ;BR IF SWITCH READINGS ARE OK
007626                                          ERRDF   27,,SWERR               ;CANNOT READ SWITCHES PROPERLY
007626  104442                                  TRAP    T$ERCODE
007630  000033                                  .WORD   27
007632  010134                                  .WORD   SWERR
007634                                  1$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
007634  104006                                  EMT     C$CLP1
007636                                          EXIT    TST                     ;EXIT
007636  104032                                  EMT     C$EXIT
007640  000524                                  .WORD   L10051-.
007642  013737  177524  010130          PRTSW:  MOV     LSREG,TEMP              ;COPY CONTENTS OF LSREG
007650  005037  010132                          CLR     SWCHON                  ;CLEAR MASK
007654  012737  000014  010126                  MOV     #14,SWCNT               ;SET SWITCH COUNT
007662  032737  000001  010130          LP:     BIT     #BIT0,TEMP              ;TEST FOR SWITCH SET
007670  001403                                  BEQ     2$                      ;BR IF NOT SET
007672  052737  100000  010132                  BIS     #BIT15,SWCHON           ;IF SET, THEN SET CORRESPNDING BIT IN MASK
007700  000241                          2$:     CLC                             ;CLEAR C-BIT FOR ROTATE
007702  006037  010132                          ROR     SWCHON                  ;ROTATE SWSET
007706  006037  010130                          ROR     TEMP                    ;GET READY TO TEST NEXT SWITCH
007712  005337  010126                          DEC     SWCNT                   ;DECREMENT SWITCH COUNT
007716  001361                                  BNE     LP                      ;LOOP UNTIL ALL SWITCHES HAVE BEEN CHECKED
007720  000241                                  CLC                             ;CLEAR C-BIT FOR ROTATE
007722  006037  010132                          ROR     SWCHON                  ;ROTATE DATA
007726  006037  010132                          ROR     SWCHON                  ;ROTATE DATA
007732  006037  010132                          ROR     SWCHON                  ;ROTATE DATA
007736                                          PRINTF  #READN,SWCHON           ;PRINT SWITCH SETTINGS
007736  013746  010132                          MOV     SWCHON,-(SP)
007742  012746  010166                          MOV     #READN,-(SP)
007746  012746  000002                          MOV     #2,-(SP)
007752  010600                                  MOV     SP,R0
007754  104017                                  EMT     C$PNTF
007756  062706  000006                          ADD     #6,SP

007762  013702  010132                          MOV     SWCHON,R2               ;COPY SWITCH SETTINGS
007766  012701  000001                          MOV     #1,R1                   ;SET SWITCH NUMBER = 1
007772  032702  000001          TAG1:   BIT     #BIT0,R2                ;IS THIS SWITCH ON?
007776  001411                                  BEQ     TAG2                    ;BR IF NO
010000                                          PRINTF  #MESSG1,R1              ;PRINT SWITCH NUMBER
010000  010146                                  MOV     R1,-(SP)
010002  012746  010217                          MOV     #MESSG1,-(SP)
```

```
 1966  010006  012746  000002                 MOV     #2,-(SP)
 1967  010012  010600                         MOV     SP,R0
 1968  010014  104017                         EMT     C$PNTF
 1969  010016  062706  000006                 ADD     #6,SP
 1970  010022  005201                 TAG2:   INC     R1              ;INCREMENT SWITCH NUMBER
 1971  010024  006002                         ROR     R2              ;ROTATE SWITCH REGISTER
 1972  010026  022701  000010                 CMP     #10,R1          ;FINISHED WITH E15?
 1973  010032  002357                         BGE     TAG1            ;BR IF NO
 1974  010034  012701  000001                 MOV     #1,R1           ;RESET SWITCH NUMBER FOR E21
 1975  010040  032702  000001         TAG3:   BIT     #BIT0,R2        ;IS THIS SWITCH SET?
 1976  010044  001411                         BEQ     TAG4            ;BR IF NO
 1977  010046                                 PRINTF  #MESSG2,R1      ;PRINT SWITCH NUMBER
 1978  010046  010146                         MOV     R1,-(SP)
 1979  010050  012746  010232                 MOV     #MESSG2,-(SP)
 1980  010054  012746  000002                 MOV     #2,-(SP)
 1981  010060  010600                         MOV     SP,R0
 1982  010062  104017                         EMT     C$PNTF
 1983  010064  062706  000006                 ADD     #6,SP
 1984  010070  005201                 TAG4:   INC     R1              ;INCREMENT SWITCH NUMBER
 1985  010072  006002                         ROR     R2              ;ROTATE SWITCH REGISTER
 1986  010074  022701  000004                 CMP     #4,R1           ;FINISHED?
 1987  010100  002357                         BGE     TAG3            ;BR IF NO
 1988  010102                                 PRINTF  #NEWLIN
 1989  010102  012746  010245                 MOV     #NEWLIN,-(SP)
 1990  010106  012746  000001                 MOV     #1,-(SP)
 1991  010112  010600                         MOV     SP,R0
 1992  010114  104017                         EMT     C$PNTF
 1993  010116  062706  000004                 ADD     #4,SP
 1994
 1995  010122                                 EXIT TST
 1996  010122  104032                         EMT     C$EXIT
 1997  010124  000240                          .WORD   L10051-.
 1998
 1999  010126  000000                 SWCNT:  .WORD   0
 2000  010130  000000                 TEMP:   .WORD   0
 2001  010132  000000                 SWCHON: .WORD   0
 2002
 2003  010134                                 BGNMSG  SWERR
 2004  010134                         SWERR::
 2005  010134                                 PRINTB  #SERR1,SWSET,LSREG
 2006  010134  013746  177524                 MOV     LSREG,-(SP)
 2007  010140  013746  002206                 MOV     SWSET,-(SP)
 2008  010144  012746  010250                 MOV     #SERR1,-(SP)
 2009  010150  012746  000003                 MOV     #3,-(SP)
 2010  010154  010600                         MOV     SP,R0
 2011  010156  104014                         EMT     C$PNTB
 2012  010160  062706  000010                 ADD     #10,SP
 2013  010164                                 ENDMSG
 2014  010164                         L10052:
 2015  010164  104023                         EMT     C$MSG
 2016
 2017  010166  040445  053523  052111 READN:  .ASCIZ  /%ASWITCHES ON  %06%A /
 2018  010174  044103  051505  047440
 2019  010202  020116  020072  047445
 2020  010210  022466  020101  020072
 2021  010216     000
```

```
  2022  010217     045  040501  042045  MESSG1: .ASCIZ  /%AA%D1%A, /
  2023  010224  022461  026101  000040
  2024  010232  040445  022502  030504  MESSG2: .ASCIZ  /%AB%D1%A, /
  2025  010240  040445  020054     000
  2026  010245     045  000116          NEWLIN: .ASCIZ  /%N/
  2027  010250  040445  044504  020104  SERR1:  .ASCII  /%ADID NOT RECOGNIZE ALL SWITCHES AS ON%N/
  2028  010256  047516  020124  042522
  2029  010264  047503  047107  055111
  2030  010272  020105  046101  020114
  2031  010300  053523  052111  044103
  2032  010306  051505  040440  020123
  2033  010314  047117  047045
  2034  010320  040445  054105  042520          .ASCIZ  /%AEXPECTED:  %06%S5%ARECEIVED: %06%N/
  2035  010326  052103  042105  020072
  2036  010334  047445  022466  032523
  2037  010342  040445  042522  042503
  2038  010350  053111  042105  022472
  2039  010356  033117  047045     000
  2040          010364                  .EVEN
  2041  010364                          ENDTST
  2042  010364                  L10051:
  2043  010364  104001                  EMT     C$ETST
  2044
```

```
                                .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.
                                ;--
010366                                  BGNTST
010366                                  BGNSUB
010366  104002                          EMT     C$BSUB
010370                                  MANUAL                          ;MANUAL INTERVENTION OK?
010370  104051                          EMT     C$MANI
010372                                  BNCOMPLETE      STRT            ;BR IF NO
010372  103014                          BCC     STRT
010374  005737  002174                  TST     PASS                    ;FIRST PASS?
010400  001032                          BNE     RSTRT                   ;BR IF NO
010402                                  GMANIL  DADDR,RSET,1,YES
010402  104043                          EMT     C$GMAN
010404  000404                          BR      10000$
010406  002222                          .WORD   RSET
010410  000130                          .WORD   T$CODE
010412  011473                          .WORD   DADDR
010414  000001                          .WORD   1
010416                          10000$:
010416  005737  002222                  TST     RSET                    ;STANDARD-JUMPERS?
010422  001404                          BEQ     GETAD                   ;BR IF NO
010424  012737  000400  010746  STRT:   MOV     #400,DRLP               ;STORE STARTING ADDRESS
010432  000415                          BR      RSTRT                   ;GO PERFORM TEST
010434                          GETAD:  GMANID  LOADR,STORE,D,-1,0,24,NO
010434  104043                          EMT     C$GMAN
010436  000406                          BR      10001$
010440  002210                          .WORD   STORE
010442  000042                          .WORD   T$CODE
010444  002774                          .WORD   LOADR
010446  177777                          .WORD   -1
010450  000000                          .WORD   T$LOLIM
010452  000024                          .WORD   T$HILIM
010454                          10001$:
010454  004737  004732                  JSR     PC,SETADR               ;GET STARTING ADDRESS
010460  013737  002160  010746          MOV     LOPAG,DRLP              ;STORE STARTING ADDRESS
010466  013737  010746  177520  RSTRT:  MOV     DRLP,PCR                ;SET UP PCR
010474  012737  000010  002162  DRTST:  MOV     #10,COUNTR              ;SET NUMBER OF CHECKWORDS TO CHECK
010502  012705  002134                  MOV     #SFPTBL,R5              ;LOCATION OF CHECKWORDS
010506  012737  000001  002166          MOV     #1,RFLAG                ;INDICATE ROM
010514  005037  002154          DLOOP:  CLR     BCF                     ;SIGNAL LOW BYTES ARE BEING CHECKED
010520  122737  177777  173774          CMPB    #-1,@#173774            ;DOES THE ROM EXIST?
010526  001005                          BNE     1$                      ;BR IF YES
010530                                  ERRDF   30,,DERR1,CKLOOP        ;DIAGNOSTIC ROM E48 NOT FOUND
010530  104542                          TRAP    T$ERCODE
010532  000036                          .WORD   30
010534  010750                          .WORD   DERR1
010536                                  EXIT    TST                     ;EXIT TEST,ROM NOT FOUND
010536  104032                          EMT     C$EXIT
010540  000754                          .WORD   L10053-.
010542                          1$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
```

```
2101  010542  104006                        EMT     C$CLP1
2102  010544  004737  004122                JSR     PC,CHKSUM               ;COMPUTE THE ACTUAL CHECKSUM
2103  010550  113737  173776  002170        MOVB    @#173776,EXPSUM         ;GET THE STORED CHECKSUM
2104  010556  063737  002172  002170        ADD     ACTSUM,EXPSUM           ;ADD THE EXPECTED AND ACTUAL CHECKSUMS
2105  010564  105737  002170                TSTB    EXPSUM                  ;BYTE RESULT = 0?
2106  010570  001403                        BEQ     2$                      ;BR IF YES
2107  010572                                ERRDF   31.,DERR2,CKLOOP        ;CHECKSUM ERROR IN DIAGNOSTIC ROM
2108  010572  104542                        TRAP    T$ERCODE
2109  010574  000037                        .WORD   31
2110  010576  010776                        .WORD   DERR2
2111  010600                        2$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
2112  010600  104006                        EMT     C$CLP1
2113  010602                                ENDSUB
2114  010602                        L10054:
2115  010602  104003                        EMT     C$ESUB
2116
2117
2118  010604                                BGNSUB
2119  010604  104002                        EMT     C$BSUB
2120  010606  012737  000001  002154        MOV     #1,BCF                  ;SET BCF TO DENOTE HIGH BYTES
2121  010614  122737  177777  173775        CMPB    #-1,@#173775            ;DOES THE ROM EXIST?
2122  010622  001005                        BNE     3$                      ;BR IF YES
2123  010624                                ERRDF   32.,DERR3,CKLOOP        ;DIAGNOSTIC ROM E53 NOT FOUND
2124  010624  104542                        TRAP    T$ERCODE
2125  010626  000040                        .WORD   32
2126  010630  011024                        .WORD   DERR3
2127  010632                                EXIT    TST                     ;EXIT TEST, ROM NOT FOUND
2128  010632  104032                        EMT     C$EXIT
2129  010634  000660                        .WORD   L10053-.
2130  010636                        3$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
2131  010636  104006                        EMT     C$CLP1
2132  010640  004737  004122                JSR     PC,CHKSUM               ;COMPUTE THE ACTUAL CHECKSUM
2133  010644  113737  173777  002170        MOVB    @#173777,EXPSUM         ;GET EXPECTED CHECKSUM
2134  010652  063737  002172  002170        ADD     ACTSUM,EXPSUM           ;ADD THE EXPECTED AND ACTUAL CHECKSUMS
2135  010660  105737  002170                TSTB    EXPSUM                  ;BYTE RESULT = 0?
2136  010664  001403                        BEQ     4$                      ;BR IF YES
2137  010666                                ERRDF   33.,DERR4,CKLOOP        ;CHECKSUM ERROR IN DIAGNOSTIC ROM
2138  010666  104542                        TRAP    T$ERCODE
2139  010670  000041                        .WORD   33
2140  010672  011052                        .WORD   DERR4
2141  010674                        4$:     CKLOOP
2142  010674  104006                        EMT     C$CLP1
2143  010676                                ENDSUB
2144  010676                        L10055:
2145  010676  104003                        EMT     C$ESUB
2146
2147  010700                                BGNSUB
2148  010700  104002                        EMT     C$BSUB
2149  010702  022537  173776                CMP     (R5)+,@#173776          ;VERIFY THE CHECKWORD FOR THIS PAGE
2150  010706  001403                        BEQ     5$                      ;BR IF THE SAME
2151  010710                                ERRDF   34.,DERR5,CKLOOP        ;CHECKWORD ERROR
2152  010710  104542                        TRAP    T$ERCODE
2153  010712  000042                        .WORD   34
2154  010714  011100                        .WORD   DERR5
2155  010716                        5$:     CKLOOP
2156  010716  104006                        EMT     C$CLP1
```

```
2157  010720                                    ENDSUB
2158  010720                              L10056:
2159  010720  104003                            EMT     C$ESUB
2160
2161
2162  010722                                    BGNSUB
2163  010722  104002                            EMT     C$BSUB
2164  010724  062737  001002  177520            ADD     #1002,PCR           ;NEXT PAGE IN PCR
2165  010732  005337  002162                    DEC     COUNTR              ;DECREMENT CHECKWORD COUNT
2166  010736  001266                            BNE     DLOOP               ;LOOP UNTIL ALL 20 PAGES HAVE BEEN CHECKED
2167  010740                                    ENDSUB
2168  010740                              L10057:
2169  010740  104003                            EMT     C$ESUB
2170
2171  010742                                    EXIT    TST
2172  010742  104032                            EMT     C$EXIT
2173  010744  000550                            .WORD   L10053-.
2174
2175  010746  000000                            DRLP:   .WORD   0
2176
2177  010750                              BGNMSG  DERR1
2178  010750                              DERR1::
2179  010750                              PRINTB  #LRAERR,#NODR
2180  010750  012746  011447                    MOV     #NODR,-(SP)
2181  010754  012746  011126                    MOV     #LRAERR,-(SP)
2182  010760  012746  000002                    MOV     #2,-(SP)
2183  010764  010600                            MOV     SP,R0
2184  010766  104014                            EMT     C$PNTB
2185  010770  062706  000006                    ADD     #6,SP
2186  010774                              ENDMSG
2187  010774                              L10060:
2188  010774  104023                            EMT     C$MSG
2189
2190  010776                              BGNMSG  DERR2
2191  010776                              DERR2::
2192  010776                              PRINTB  #LOWROM,#CKERR
2193  010776  012746  002624                    MOV     #CKERR,-(SP)
2194  011002  012746  011202                    MOV     #LOWROM,-(SP)
2195  011006  012746  000002                    MOV     #2,-(SP)
2196  011012  010600                            MOV     SP,R0
2197  011014  104014                            EMT     C$PNTB
2198  011016  062706  000006                    ADD     #6,SP
2199  011022                              ENDMSG
2200  011022                              L10061:
2201  011022  104023                            EMT     C$MSG
2202
2203  011024                              BGNMSG  DERR3
2204  011024                              DERR3::
2205  011024                              PRINTB  #HRAERR,#NODR
2206  011024  012746  011447                    MOV     #NODR,-(SP)
2207  011030  012746  011251                    MOV     #HRAERR,-(SP)
2208  011034  012746  000002                    MOV     #2,-(SP)
2209  011040  010600                            MOV     SP,R0
2210  011042  104014                            EMT     C$PNTB
2211  011044  062706  000006                    ADD     #6,SP
2212  011050                              ENDMSG
```

```
2213  011050                          L10062:
2214  011050  104023                          EMT     C$MSG
2215
2216  011052                          BGNMSG  DERR4
2217  011052                          DERR4::
2218  011052                          PRINTB  #HIROM,#CKERR
2219  011052  012746  002624                  MOV     #CKERR,-(SP)
2220  011056  012746  011325                  MOV     #HIROM,-(SP)
2221  011062  012746  000002                  MOV     #2,-(SP)
2222  011066  010600                          MOV     SP,R0
2223  011070  104014                          EMT     C$PNTB
2224  011072  062706  000006                  ADD     #6,SP
2225  011076                          ENDMSG
2226  011076                          L10063:
2227  011076  104023                          EMT     C$MSG
2228
2229  011100                          BGNMSG  DERR5
2230  011100                          DERR5::
2231  011100                          PRINTB  #MISTAK
2232  011100  012746  011375                  MOV     #MISTAK,-(SP)
2233  011104  012746  000001                  MOV     #1,-(SP)
2234  011110  010600                          MOV     SP,R0
2235  011112  104014                          EMT     C$PNTB
2236  011114  062706  000004                  ADD     #4,SP
2237  011120  004737  004346          JSR     PC,VIRTAD
2238  011124                          ENDMSG
2239  011124                          L10064:
2240  011124  104023                          EMT     C$MSG
2241
2242  011126  052045  047045  040445  LRAERR: .ASCIZ  /%T%N%ACANNOT ACCESS DIAGNOSTIC ROM IN E48%N/
2243  011134  040503  047116  052117
2244  011142  040440  041503  051505
2245  011150  020123  044504  043501
2246  011156  047516  052123  041511
2247  011164  051040  046517  044440
2248  011172  020116  032105  022470
2249  011200  000116
2250
2251  011202  052045  047045  040445  LOWROM: .ASCIZ  /%T%N%ALOW BYTE DIAGNOSTIC ROM IN E48%N/
2252  011210  047514  020127  054502
2253  011216  042524  042040  040511
2254  011224  047107  051517  044524
2255  011232  020103  047522  020115
2256  011240  047111  042440  034064
2257  011246  047045     000
2258
2259  011251     045  022524  022516  HRAERR: .ASCIZ  /%T%N%ACANNOT ACCESS DIAGNOSTIC ROM IN E53%N/
2260  011256  041501  047101  047516
2261  011264  020124  041501  042503
2262  011272  051523  042040  040511
2263  011300  047107  051517  044524
2264  011306  020103  047522  020115
2265  011314  047111  042440  031465
2266  011322  047045     000
2267
2268  011325     045  022524  022516  HIROM:  .ASCIZ  /%T%N%AHIGH BYTE DIAGNOSTIC ROM IN E53%N/
```

```
2269  011332  044101  043511  020110
2270  011340  054502  042524  042040
2271  011346  040511  047107  051517
2272  011354  044524  020103  047522
2273  011362  020115  047111  042440
2274  011370  031465  047045     000
2275
2276  011375     045  044501  041516  MISTAK: .ASCIZ  /%AINCORRECT CHECKWORD IN DIAGNOSTIC ROM%N/
2277  011402  051117  042522  052103
2278  011410  041440  042510  045503
2279  011416  047527  042122  044440
2280  011424  020116  044504  043501
2281  011432  047516  052123  041511
2282  011440  051040  046517  047045
2283  011446     000
2284
2285  011447     116  047117  042455  NODR:   .ASCIZ  /NON-EXISTENT MEMORY/
2286  011454  044530  052123  047105
2287  011462  020124  042515  047515
2288  011470  054522     000
2289
2290  011473     123  040524  042116  DADDR:  .ASCIZ  /STANDARD JUMPERS/
2291  011500  051101  020104  052512
2292  011506  050115  051105  000123
2293
2294                                    .EVEN
2295  011514                           ENDTST
2296  011514                    L10053:
2297  011514  104001                    EMT     CSETST
```

```
                                .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.
                                ;--
011516                                  BGNTST

011516                                  BGNSUB
011516  104002                  BGNSUB  EMT     C$BSUB
011520                                  MANUAL                          ;UNDER APT?
011520  104051                          EMT     C$MANI
011522                                  BNCOMPLETE      DFLTST          ;SKIP TEST IF YES
011522  103112                          BCC     DFLTST
011524  005037  013530                  CLR     ADDON                   ;RESTORE DEFAULT
011530  005737  002174                  TST     PASS                    ;FIRST PASS?
011534  001422                          BEQ     GET                     ;BR IF YES
011536  005737  013534                  TST     LOD1                    ;EXPANDED DIAGNOSTIC ROM?
011542  001153                          BNE     LD1                     ;BR IF YES
011544  005737  013536                  TST     LOD2                    ;EPROM IN SOCKETS?
011550  001402                          BEQ     P1                      ;BR IF NO
011552  000137  012420                  JMP     LD2                     ;TEST EPROM
011556  005737  013540          P1:     TST     LOD3                    ;SYSTEM ROM ?
011562  001402                          BEQ     P2                      ;BR IF NO
011564  000137  012766                  JMP     LD3                     ;TEST ROM
011570  005737  013542          P2.     TST     LOD4                    ;SYSTEM EPROM?
011574  001465                          BEQ     DFLTST                  ;EXIT IF NO
011576  000137  013324                  JMP     LD4                     ;TEST EPROM
011602                          GET:    GMANIL  EXEC,ADDON,1,YES
011602  104043                          EMT     C$GMAN
011604  000404                          BR      10000$
011606  013530                          .WORD   ADDON
011610  000130                          .WORD   T$CODE
011612  014037                          .WORD   EXEC
011614  000001                          .WORD   1
011616                          10000$:
011616  005737  013530                  TST     ADDON                   ;ADDITIONAL MEMORY?
011622  001452                          BEQ     DFLTST                  ;BR IF NO
```

```
2354  011624                          DIAIN:  GMANIL  EXPND,RESPND,1,NO
2355  011624  104043                          EMT     C$GMAN
2356  011626  000404                          BR      10001$
2357  011630  002220                          .WORD   RESPND
2358  011632  000120                          .WORD   T$CODE
2359  011634  014066                          .WORD   EXPND
2360  011636  000001                          .WORD   1
2361  011640                          10001$:
2362  011640  005737  002220                  TST     RESPND          ;EXPANDED DIAGNOSTIC ROM?
2363  011644  001045                          BNE     EXPROM          ;BR IF YES
2364  011646                          EPRIN:  GMANIL  EPRM,RESPND,1,NO
2365  011646  104043                          EMT     C$GMAN
2366  011650  000404                          BR      10002$
2367  011652  002220                          .WORD   RESPND
2368  011654  000120                          .WORD   T$CODE
2369  011656  014116                          .WORD   EPRM
2370  011660  000001                          .WORD   1
2371  011662                          10002$:
2372  011662  005737  002220                  TST     RESPND          ;EPROM IN SOCKETS?
2373  011666  001402                          BEQ     SYSRIN          ;BR IF NO
2374  011670  000137  012306                  JMP     EPRMT           ;JUMP TO ACCEPT INPUT
2375  011674                          SYSRIN: GMANIL  SYSR,RESPND,1,NO
2376  011674  104043                          EMT     C$GMAN
2377  011676  000404                          BR      10003$
2378  011700  002220                          .WORD   RESPND
2379  011702  000120                          .WORD   T$CODE
2380  011704  014137                          .WORD   SYSR
2381  011706  000001                          .WORD   1
2382  011710                          10003$:
2383  011710  005737  002220                  TST     RESPND          ;SYSTEM ROM?
2384  011714  001402                          BEQ     SYSEIN          ;BR IF NO
2385  011716  000137  012626                  JMP     SYSRT           ;INPUT CHECKWORDS
2386  011722                          SYSEIN: GMANIL  SYSE,RESPND,1,NO
2387  011722  104043                          EMT     C$GMAN
2388  011724  000404                          BR      10004$
2389  011726  002220                          .WORD   RESPND
2390  011730  000120                          .WORD   T$CODE
2391  011732  014152                          .WORD   SYSE
2392  011734  000001                          .WORD   1
2393  011736                          10004$:
2394  011736  005737  002220                  TST     RESPND          ;SYSTEM EPROM?
2395  011742  001402                          BEQ     DFLTST          ;BR IF NO
2396  011744  000137  013164                  JMP     SYSET           ;INPUT CHECKWORDS
2397  011750                          DFLTST: EXIT    TST             ;NO ADDTL. MEMORY -- EXIT
2398  011750  104032                          EMT     C$EXIT
2399  011752  002344                          .WORD   L10065-.
2400  011754                                  ENDSUB
2401  011754                          L10066:
2402  011754  104003                          EMT     C$ESUB
2403
2404
2405  011756                                  BGNSUB
2406  011756  104002                          EMT     C$BSUB
2407  011760  005037  002232          EXPROM: CLR     ERRFLG          ;CLEAR ERROR FLAG
2408  011764  012737  000010  002212          MOV     #10,WORDCT      ;COUNT 8 CHECKWORDS
2409  011772  012702  002234                  MOV     #EXPDIA,R2      ;POINTER TO STORAGE TABLE
```

```
2410  011776  004737  004166                  JSR     PC,INPUT                ;INPUT CHECKWORDS
2411  012002                                  GMANIL  EXADD,ANSR,1,YES
2412  012002  104043                         EMT     C$GMAN
2413  012004  000404                         BR      10000$
2414  012006  002164                         .WORD   ANSR
2415  012010  000130                         .WORD   T$CODE
2416  012012  014167                         .WORD   EXADD
2417  012014  000001                         .WORD   1
2418  012016                          10000$:
2419  012016  005737  002164                  TST     ANSR                    ;STANDARD MEMORY RANGE?
2420  012022  001020                         BNE     1$                      ;BR IF YES
2421  012024  005237  002164                  INC     ANSR                    ;RESTORE DEFAULT VALUE
2422  012030                                  GMANID  LOADR,STORE,D,-1,0,30,NO
2423  012030  104043                         EMT     C$GMAN
2424  012032  000406                         BR      10001$
2425  012034  002210                         .WORD   STORE
2426  012036  000042                         .WORD   T$CODE
2427  012040  002774                         .WORD   LOADR
2428  012042  177777                         .WORD   -1
2429  012044  000000                         .WORD   T$LOLIM
2430  012046  000030                         .WORD   T$HILIM
2431  012050                          10001$:
2432  012050  004737  004732                  JSR     PC,SETADR               ;GET FIRST PAGE ADDRESS
2433  012054  013737  002160  013534          MOV     LOPAG,LOD1              ;STORE LOW PAGE NO.
2434  012062  000403                         BR      LD1                     ;SKIP NEXT INSTRUCTION
2435  012064  012737  010420  013534  1$:     MOV     #010420,LOD1            ;STANDARD PAGE = 20,21  2-4K RANGE
2436  012072  013737  013534  177520  LD1:    MOV     LOD1,PCR                ;LOAD STARTING PAGE
2437  012100  012737  000001  002166          MOV     #1,RFLAG                ;INDICATE ROM
2438  012106  012703  002234                  MOV     #EXPDIA,R3              ;POINTER TO CHECKWORDS
2439  012112  012737  000010  002162          MOV     #10,COUNTR              ;PAGE COUNT
2440  012120  012337  002216          EXPTST: MOV     (R3)+,CKWD              ;GET CHECKWORD FOR THIS PAGE
2441  012124  004737  004504                  JSR     PC,MEMTST               ;TEST MEMORY
2442  012130  005737  002156                  TST     REAL                    ;DOES THE MEMORY EXIST?
2443  012134  001455                         BEQ     E3                      ;BR IF NO
2444  012136  005737  002232                  TST     ERRFLG                  ;ANY OTHER ERRORS?
2445  012142  001421                         BEQ     NOERR                   ;BR IF NO
2446  012144  004737  004346                  JSR     PC,VIRTAD               ;GET ADDRESS OF ERROR
2447  012150  005737  002154                  TST     BCF                     ;LOW BYTE PAGE?
2448  012154  001004                         BNE     HIGH                    ;BR IF NO
2449  012156  012737  002667  002230          MOV     #LOBYT,BYTLOC           ;SET POINTER FOR ERROR MSG.
2450  012164  000403                         BR      DATOUT                  ;PRINT ERROR MESSAGE
2451  012166  012737  002731  002230  HIGH:   MOV     #HIBYT,BYTLOC           ;POINTER FOR ERROR MSG.
2452  012174  022737  000001  002232  DATOUT: CMP     #1,ERRFLG               ;CHECKSUM ERROR?
2453  012202  001420                         BEQ     E1                      ;BR IF YES
2454  012204  000424                         BR      E2                      ;ELSE CHECKWORD ERROR
2455  012206  062737  001002  177520  NOERR:  ADD     #1002,PCR               ;ADJUST PCR
2456  012214  005337  002162                  DEC     COUNTR                  ;DEC PAGE COUNT
2457  012220  001337                         BNE     EXPTST                  ;LOOP UNTIL ALL PAGES ARE TESTED
2458  012222  005737  002174          MORE:   TST     PASS                    ;FIRST PASS?
2459  012226  001002                         BNE     1$                      ;BR IF NO
2460  012230  000137  011646                  JMP     EPRIN                   ;TEST ANY ADDITIONAL MEMORY
2461  012234  000137  011556          1$:     JMP     P1                      ;FIND ANY ADDITIONAL MEMORY
2462  012240                                  EXIT    SUB                     ;END OF SUBTEST
2463  012240  104032                         EMT     C$EXIT
2464  012242  000040                         .WORD   L10067-
2465  012244                          E1:     ERRDF   35,EXPND,CKSME,CKLOOP
```

```
2466  012244  104562                          TRAP    T$ERCODE
2467  012246  000043                          .WORD   35
2468  012250  014066                          .WORD   EXPND
2469  012252  013544                          .WORD   CKSME
2470  012254  000762                          BR      MORE
2471  012256                          E2:     ERRDF   36,EXPND,CWKDE,CKLOOP
2472  012256  104562                          TRAP    T$ERCODE
2473  012260  000044                          .WORD   36
2474  012262  014066                          .WORD   EXPND
2475  012264  013602                          .WORD   CWKDE
2476  012266  000755                          BR      MORE
2477  012270                          E3:     ERRDF   37,EXPND,NONXT,CKLOOP
2478  012270  104562                          TRAP    T$ERCODE
2479  012272  000045                          .WORD   37
2480  012274  014066                          .WORD   EXPND
2481  012276  013634                          .WORD   NONXT
2482  012300  000750                          BR      MORE
2483  012302                                  ENDSUB
2484  012302                          L10067:
2485  012302  104003                          EMT     C$ESUB
2486
2487  012304                                  BGNSUB
2488  012304  104002                          EMT     C$BSUB
2489  012306  005037  002232          EPRMT:  CLR     ERRFLG                  ;CLEAR ERROR FLAG
2490  012312  012737  000010  002212        MOV     #10,WORDCT              ;INPUT 8 CHECKWORDS
2491  012320  012702  002254                MOV     #EPROM,R2               ;POINTER TO STORAGE TABLE
2492  012324  004737  004166                JSR     PC,INPUT                ;INPUT CHECKWORDS
2493  012330                                  GMANIL  EPADD,ANSR,1,YES
2494  012330  104043                          EMT     C$GMAN
2495  012332  000404                          BR      10000$
2496  012334  002164                          .WORD   ANSR
2497  012336  000130                          .WORD   T$CODE
2498  012340  014215                          .WORD   EPADD
2499  012342  000001                          .WORD   1
2500  012344                          10000$:
2501  012344  005737  002164                TST     ANSR                    ;STANDARD MEMORY RANGE?
2502  012350  001020                          BNE     1$                      ;BR IF YES
2503  012352  005237  002164                INC     ANSR                    ;RESTORE DEFAULT
2504  012356                                  GMANID  LOADR,STORE,D,-1,0,30,NO
2505  012356  104043                          EMT     C$GMAN
2506  012360  000406                          BR      10001$
2507  012362  002210                          .WORD   STORE
2508  012364  000042                          .WORD   T$CODE
2509  012366  002774                          .WORD   LOADR
2510  012370  177777                          .WORD   -1
2511  012372  000000                          .WORD   T$LOLIM
2512  012374  000030                          .WORD   T$HILIM
2513  012376                          10001$:
2514  012376  004737  004732                JSR     PC,SETADR               ;GET FIRST PAGE ADDRESS
2515  012402  013737  002160  013536        MOV     LOPAG,LOD2              ;STORE LOW PAGE NO.
2516  012410  000403                          BR      LD2                     ;SKIP NEXT INSTRUCTION
2517  012412  012737  020440  013536  1$:     MOV     #020440,LOD2            ;STANDARD PAGE = 40,41  4-6K RANGE
2518  012420  013737  013536  177520  LD2:    MOV     LOD2,PCR                ;LOAD STARTING ADDRESS
2519  012426  005037  002166                CLR     RFLAG                   ;INDICATE EPROM
2520  012432  012703  002254                MOV     #EPROM,R3               ;POINT TO CHECKWORDS
2521  012436  012737  000010  002162        MOV     #10,COUNTR              ;PAGE COUNT
```

```
2522  012444  012337  002216          EPRTST: MOV     (R3)+,CKWD              ;GET CHECKWORD FOR THIS PAGE
2523  012450  004737  004504                  JSR     PC,MEMTST               ;TEST MEMORY
2524  012454  005737  002156                  TST     REAL                    ;DOES THE MEMORY EXIST?
2525  012460  001453                          BEQ     E6                      ;BR IF NO
2526  012462  005737  002232                  TST     ERRFLG                  ;ANY OTHER ERRORS?
2527  012466  001421                          BEQ     NONE                    ;BR IF NO
2528  012470  004737  004346                  JSR     PC,VIRTAD               ;GET ADDRESS OF ERROR
2529  012474  005737  002154                  TST     BCF                     ;LOW BYTE PAGE?
2530  012500  001004                          BNE     HIADD                   ;BR IF NO
2531  012502  012737  002667  002230          MOV     #LOBYT,BYTLOC           ;SET POINTER FOR ERROR MSG.
2532  012510  000403                          BR      PRIOUT                  ;PRINT ERROR MESSAGE
2533  012512  012737  002731  002230  HIADD:  MOV     #HIBYT,BYTLOC           ;POINTER FOR ERROR MSG.
2534  012520  022737  000001  002232  PRIOUT: CMP     #1,ERRFLG               ;CHECKSUM ERROR?
2535  012526  001416                          BEQ     E4                      ;BR IF YES
2536  012530  000422                          BR      E5                      ;ELSE CHECKWORD ERROR
2537  012532  062737  001002  177520  NONE:   ADD     #1002,PCR               ;ADJUST PAGE IN PCR
2538  012540  005337  002162                  DEC     COUNTR                  ;DEC PAGE COUNT
2539  012544  001337                          BNE     EPRTST                  ;LOOP UNTIL FINISHED
2540  012546  005737  002174          ADDTL:  TST     PASS                    ;FIRST PASS?
2541  012552  001002                          BNE     1$                      ;BR IF NO
2542  012554  000137  011674                  JMP     SYSRIN                  ;TEST ANY ADDITIONAL MEMORY
2543  012560  000137  011570          1$:     JMP     P2                      ;FIND ANY ADDITIONAL MEMORY
2544  012564                          E4:     ERRDF   40,EPRM,CKSME,CKLOOP
2545  012564  104562                          TRAP    T$ERCODE
2546  012566  000050                          .WORD   40
2547  012570  014116                          .WORD   EPRM
2548  012572  013544                          .WORD   CKSME
2549  012574  000764                          BR      ADDTL
2550  012576                          E5:     ERRDF   41,EPRM,CWKDE,CKLOOP
2551  012576  104562                          TRAP    T$ERCODE
2552  012600  000051                          .WORD   41
2553  012602  014116                          .WORD   EPRM
2554  012604  013602                          .WORD   CWKDE
2555  012606  000757                          BR      ADDTL
2556  012610                          E6:     ERRDF   42,EPRM,NONXT,CKLOOP
2557  012610  104562                          TRAP    T$ERCODE
2558  012612  000052                          .WORD   42
2559  012614  014116                          .WORD   EPRM
2560  012616  013634                          .WORD   NONXT
2561  012620  000752                          BR      ADDTL
2562  012622                                  ENDSUB
2563  012622                          L10070:
2564  012622  104003                          EMT     C$ESUB
2565
2566  012624                                  BGNSUB
2567  012624  104002                          EMT     C$BSUB
2568  012626  005037  002232          SYSRT:  CLR     ERRFLG                  ;CLEAR ERROR FLAG
2569  012632                                  GMANID  RWDCT,RESPND,0,-1,10,100,NO
2570  012632  104043                          EMT     C$GMAN
2571  012634  000406                          BR      10000$
2572  012636  002220                          .WORD   RESPND
2573  012640  000042                          .WORD   T$CODE
2574  012642  013775                          .WORD   RWDCT
2575  012644  177777                          .WORD   -1
2576  012646  000010                          .WORD   T$LOLIM
2577  012650  000100                          .WORD   T$HILIM
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2578  012652                                  10000$:
2579  012652  013737  002220  013532                  MOV     RESPND,PGCT             ;STORE PAGE COUNT
2580  012660  013737  002220  002212                  MOV     RESPND,WORDCT           ;COPY WORD COUNT
2581  012666  012702  002274                          MOV     #SYSROM,R2              ;POINTER TO STORAGE TABLE
2582  012672  004737  004166                          JSR     PC,INPUT                ;INPUT CHECKWORDS
2583  012676                                          GMANIL  SRR,ANSR,1,YES
2584  012676  104043                                  EMT     C$GMAN
2585  012700  000404                                  BR      10001$
2586  012702  002164                                  .WORD   ANSR
2587  012704  000130                                  .WORD   T$CODE
2588  012706  014234                                  .WORD   SRR
2589  012710  000001                                  .WORD   1
2590  012712                                  10001$:
2591  012712  005737  002164                          TST     ANSR                    ;STANDARD MEMORY RANGE?
2592  012716  001020                                  BNE     1$                      ;BR IF YES
2593  012720  005237  002164                          INC     ANSR                    ;RESTORE DEFAULT VALUE
2594  012724                                      -   GMANID  LOADR,STORE,D,-1,0,30,NO
2595  012724  104043                                  EMT     C$GMAN
2596  012726  000406                                  BR      10002$
2597  012730  002210                                  .WORD   STORE
2598  012732  000042                                  .WORD   T$CODE
2599  012734  002774                                  .WORD   LOADR
2600  012736  177777                                  .WORD   -1
2601  012740  000000                                  .WORD   T$LOLIM
2602  012742  000030                                  .WORD   T$HILIM
2603  012744                                  10002$:
2604  012744  004737  004732                          JSR     PC,SETADR               ;GET FIRST PAGE ADDRESS
2605  012750  013737  002160  013540                  MOV     LOPAG,LOD3              ;STORE LOW PAGE NO.
2606  012756  000403                                  BR      LD3                     ;SKIP NEXT INSTRUCTION
2607  012760  012737  100600  013540  1$:     MOV     #100600,LOD3            ;STANDARD PAGE = 200,201  16-32K RANGE
2608  012766  013737  013540  177520  LD3:    MOV     LOD3,PCR                ;LOAD STARTING ADDRESS
2609  012774  012737  000001  002166          MOV     #1,RFLAG                ;INDICATE ROM
2610  013002  012703  002274                  MOV     #SYSROM,R3              ;POINT TO CHECKWORDS
2611  013006  013737  013532  002162          MOV     PGCT,COUNTR             ;PAGE COUNT
2612  013014  012337  002216  SYRTST: MOV     (R3)+,CKWD              ;GET CHECKWORD FOR THIS PAGE
2613  013020  004737  004504                  JSR     PC,MEMTST               ;TEST MEMORY
2614  013024  005737  002156                  TST     REAL                    ;DOES THE MEMORY EXIST?
2615  013030  001446                          BEQ     E11                     ;BR IF NO
2616  013032  005737  002232                  TST     ERRFLG                  ;ANY OTHER ERRORS?
2617  013036  001421                          BEQ     PASSED                  ;BR IF NO
2618  013040  004737  004346                  JSR     PC,VIRTAD               ;GET ADDRESS OF ERROR
2619  013044  005737  002154                  TST     BCF                     ;LOW BYTE PAGE?
2620  013050  001004                          BNE     HIGHB                   ;BR IF NO
2621  013052  012737  002667  002230          MOV     #LOBYT,BYTLOC           ;SET POINTER FOR ERROR MSG.
2622  013060  000403                          BR      MSGOUT                  ;PRINT ERROR MESSAGE
2623  013062  012737  002731  002230  HIGHB:  MOV     #HIBYT,BYTLOC           ;POINTER FOR ERROR MSG.
2624  013070  022737  000001  002232  MSGOUT: CMP     #1,ERRFLG               ;CHECKSUM ERROR?
2625  013076  001411                          BEQ     E7                      ;BR IF YES
2626  013100  000415                          BR      E10                     ;ELSE CHECKWORD ERROR
2627  013102  062737  001002  177520  PASSED: ADD     #1002,PCR               ;ADJUST PAGE IN PCR
2628  013110  005337  002162                  DEC     COUNTR                  ;DEC PAGE COUNT
2629  013114  001337                          BNE     SYRTST                  ;LOOP UNTIL FINISHED
2630  013116                          NEXT:   EXIT    TST                     ;TEST IS FINISHED
2631  013116  104032                          EMT     C$EXIT
2632  013120  001176                          .WORD   L10065-.
2633  013122                          E7:     ERRDF   43,SYSR,CKSME,CKLOOP
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2634  013122  104562                          TRAP    T$ERCODE
2635  013124  000053                          .WORD   43
2636  013126  014137                          .WORD   SYSR
2637  013130  013544                          .WORD   CKSME
2638  013132  000771                          BR      NEXT
2639  013134                          E10:    ERRDF   44,SYSR,CWKDE,CKLOOP
2640  013134  104562                          TRAP    T$ERCODE
2641  013136  000054                          .WORD   44
2642  013140  014137                          .WORD   SYSR
2643  013142  013602                          .WORD   CWKDE
2644  013144  000764                          BR      NEXT
2645  013146                          E11:    ERRDF   45,SYSR,NONXT,CKLOOP
2646  013146  104562                          TRAP    T$ERCODE
2647  013150  000055                          .WORD   45
2648  013152  014137                          .WORD   SYSR
2649  013154  013634                          .WORD   NONXT
2650  013156  000757                          BR      NEXT
2651  013160                                  ENDSUB
2652  013160                          L10071:
2653  013160  104003                          EMT     C$ESUB
2654
2655  013162                                  BGNSUB
2656  013162  104002                          EMT     C$BSUB
2657  013164  005037  002232          SYSET:  CLR     ERRFLG                  ;CLEAR ERROR FLAG
2658  013170                                  GMANID  RWDCT,RESPND,0,-1,10,40,NO
2659  013170  104043                          EMT     C$GMAN
2660  013172  000406                          BR      10000$
2661  013174  002220                          .WORD   RESPND
2662  013176  000042                          .WORD   T$CODE
2663  013200  013775                          .WORD   RWDCT
2664  013202  177777                          .WORD   -1
2665  013204  000010                          .WORD   T$LOLIM
2666  013206  000040                          .WORD   T$HILIM
2667  013210                          10000$:
2668  013210  013737  002220  013532          MOV     RESPND,PGCT             ;STORE PAGE COUNT
2669  013216  013737  002220  002212          MOV     RESPND,WORDCT           ;COPY WORD COUNT
2670  013224  012702  002274                  MOV     #SYSROM,R2              ;POINTER TO STORAGE TABLE
2671  013230  004737  004166                  JSR     PC,INPUT                ;INPUT CHECKWORDS
2672  013234                                  GMANIL  SYEE,ANSR,1,YES
2673  013234  104043                          EMT     C$GMAN
2674  013236  000404                          BR      10001$
2675  013240  002164                          .WORD   ANSR
2676  013242  000130                          .WORD   T$CODE
2677  013244  014264                          .WORD   SYEE
2678  013246  000001                          .WORD   1
2679  013250                          10001$:
2680  013250  005737  002164                  TST     ANSR                    ;STANDARD MEMORY RANGE?
2681  013254  001020                          BNE     1$                      ;BR IF YES
2682  013256  005237  002164                  INC     ANSR                    ;RESTORE DEFAULT VALUE
2683  013262                                  GMANID  LOADR,STORE,0,-1,0,30,NO
2684  013262  104043                          EMT     C$GMAN
2685  013264  000406                          BR      10002$
2686  013266  002210                          .WORD   STORE
2687  013270  000042                          .WORD   T$CODE
2688  013272  002274                          .WORD   LOADR
2689  013274  177777                          .WORD   -1
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2690  013276  000000                          .WORD   T$LOLIM
2691  013300  000030                          .WORD   T$HILIM
2692  013302                          10002$:
2693  013302  004737  004732                  JSR     PC,SETADR       ;GET FIRST PAGE ADDRESS
2694  013306  013737  002160  013542          MOV     LOPAG,LOD4      ;STORE LOW PAGE NO.
2695  013314  000403                          BR      LD4             ;SKIP NEXT INSTRUCTION
2696  013316  012737  100600  013542  1$:     MOV     #100600,LOD4    ;STANDARD PAGE = 200,201  16-24K RANGE
2697  013324  013737  013542  177520  LD4:    MOV     LOD4,PCR        ;LOAD STARTING ADDRESS
2698  013332  005037  002166                  CLR     RFLAG           ;INDICATE EPROM
2699  013336  012703  002274                  MOV     #SYSROM,R3      ;POINT TO CHECKWORDS
2700  013342  013737  013532  002162          MOV     PGCT,COUNTR     ;PAGE COUNT
2701  013350  012337  002216          SYETST: MOV     (R3)+,CKWD      ;GET CHECKWORD FOR THIS PAGE
2702  013354  004737  004504                  JSR     PC,MEMTST       ;TEST MEMORY
2703  013360  005737  002156                  TST     REAL            ;DOES THIS MEMORY EXIST?
2704  013364  001450                          BEQ     E14             ;BR IF NO
2705  013366  005737  002232                  TST     ERRFLG          ;ANY ERRORS?
2706  013372  001421                          BEQ     CONT            ;BR IF NO
2707  013374  004737  004346                  JSR     PC,VIRTAD       ;GET ADDRESS OF ERROR
2708  013400  005737  002154                  TST     BCF             ;LOW BYTE PAGE?
2709  013404  001004                          BNE     HBYTE           ;BR IF NO
2710  013406  012737  002667  002230          MOV     #LOBYT,BYTLOC   ;SET POINTER FOR ERROR MSG.
2711  013414  000403                          BR      PRIN            ;PRINT ERROR MESSAGE
2712  013416  012737  002731  002230  HBYTE:  MOV     #HIBYT,BYTLOC   ;POINTER FOR ERROR MSG.
2713  013424  022737  000001  002232  PRIN:   CMP     #1,ERRFLG       ;CHECKSUM ERROR?
2714  013432  001411                          BEQ     E12             ;BR IF YES
2715  013434  000416                          BR      E13             ;ELSE CHECKWORD ERROR
2716  013436  062737  001002  177520  CONT:   ADD     #1002,PCR       ;ADJUST PAGE IN PCR
2717  013444  005337  002162                  DEC     COUNTR          ;DEC PAGE COUNT
2718  013450  001337                          BNE     SYETST          ;LOOP UNTIL FINISHED
2719  013452                                  EXIT    TST             ;TEST IS FINISHED
2720  013452  104032                          EMT     C$EXIT
2721  013454  000642                          .WORD   L10065-.
2722  013456                          E12:    ERRDF   46,SYSE,CKSME,CKLOOP
2723  013456  104562                          TRAP    T$ERCODE
2724  013460  000056                          .WORD   46
2725  013462  014152                          .WORD   SYSE
2726  013464  013544                          .WORD   CKSME
2727  013466                                  EXIT    TST
2728  013466  104032                          EMT     C$EXIT
2729  013470  000626                          .WORD   L10065-.
2730  013472                          E13:    ERRDF   47,SYSE,CWKDE,CKLOOP
2731  013472  104562                          TRAP    T$ERCODE
2732  013474  000057                          .WORD   47
2733  013476  014152                          .WORD   SYSE
2734  013500  013602                          .WORD   CWKDE
2735  013502                                  EXIT    TST
2736  013502  104032                          EMT     C$EXIT
2737  013504  000612                          .WORD   L10065-.
2738  013506                          E14:    ERRDF   50,SYSE,NONXT,CKLOOP
2739  013506  104562                          TRAP    T$ERCODE
2740  013510  000062                          .WORD   50
2741  013512  014152                          .WORD   SYSE
2742  013514  013634                          .WORD   NONXT
2743  013516                                  EXIT    TST
2744  013516  104032                          EMT     C$EXIT
2745  013520  000576                          .WORD   L10065-.
```

```
2746  013522                                    ENDSUB
2747  013522                              L10072:
2748  013522  104003                            EMT     C$ESUB
2749
2750  013524                                    EXIT TST
2751  013524  104032                            EMT     C$EXIT
2752  013526  000570                            .WORD   L10065-.
2753
2754  013530  000000                      ADDON:  .WORD   0
2755  013532  000000                      PGCT:   .WORD   0
2756  013534  000000                      LOD1:   .WORD   0
2757  013536  000000                      LOD2:   .WORD   0
2758  013540  000000                      LOD3:   .WORD   0
2759  013542  000000                      LOD4:   .WORD   0
2760
2761
2762  013544                              BGNMSG  CKSME
2763  013544                              CKSME::
2764  013544                              PRINTB  #ERM6,BYTLOC
2765  013544  013746  002230                      MOV     BYTLOC,-(SP)
2766  013550  012746  013716                      MOV     #ERM6,-(SP)
2767  013554  012746  000002                      MOV     #2,-(SP)
2768  013560  010600                              MOV     SP,R0
2769  013562  104014                              EMT     C$PNTB
2770  013564  062706  000006                      ADD     #6,SP
2771  013570  004737  004346              JSR     PC,VIRTAD
2772  013574  004737  004072              JSR     PC,VIPRI
2773  013600                              ENDMSG
2774  013600                              L10073:
2775  013600  104023                            EMT     C$MSG
2776
2777  013602                              BGNMSG  CWKDE
2778  013602                              CWKDE::
2779  013602                              PRINTB  #ERM5
2780  013602  012746  013666                      MOV     #ERM5,-(SP)
2781  013606  012746  000001                      MOV     #1,-(SP)
2782  013612  010600                              MOV     SP,R0
2783  013614  104014                              EMT     C$PNTB
2784  013616  062706  000004                      ADD     #4,SP
2785  013622  004737  004346              JSR     PC,VIRTAD
2786  013626  004737  004072              JSR     PC,VIPRI
2787  013632                              ENDMSG
2788  013632                              L10074:
2789  013632  104023                            EMT     C$MSG
2790
2791  013634                              BGNMSG  NONXT
2792  013634                              NONXT::
2793  013634                              PRINTB  #LOST
2794  013634  012746  013745                      MOV     #LOST,-(SP)
2795  013640  012746  000001                      MOV     #1,-(SP)
2796  013644  010600                              MOV     SP,R0
2797  013646  104014                              EMT     C$PNTB
2798  013650  062706  000004                      ADD     #4,SP
2799  013654  004737  004346              JSR     PC,VIRTAD
2800  013660  004737  004072              JSR     PC,VIPRI
2801  013664                              ENDMSG
```

```
2802  013664                                L10075: .
2803  013664  104023                                EMT     C$MSG
2804
2805  013666  040445  047111  047503  ERM5:   .ASCIZ  /%AINCORRECT CHECKWORD%N/
2806  013674  051122  041505  020124
2807  013702  044103  041505  053513
2808  013710  051117  022504  000116
2809
2810  013716  040445  044103  041505  ERM6:   .ASCIZ  /%ACHECKSUM ERROR%N%T%N/
2811  013724  051513  046525  042440
2812  013732  051122  051117  047045
2813  013740  052045  047045     000
2814
2815  013745     045  047101  047117  LOST:   .ASCIZ  /%ANON-EXISTENT MEMORY%N/
2816  013752  042455  044530  052123
2817  013760  047105  020124  042515
2818  013766  047515  054522  047045
2819  013774     000
2820
2821  013775     110  053517  046440  RWDCT:  .ASCIZ  /HOW MANY CHECKWORDS WILL BE INPUT/
2822  014002  047101  020131  044103
2823  014010  041505  053513  051117
2824  014016  051504  053440  046111
2825  014024  020114  042502  044440
2826  014032  050116  052125     000
2827
2828  014037     101  054516  040440  EXEC:   .ASCIZ  /ANY ADDITIONAL MEMORY /
2829  014044  042104  052111  047511
2830  014052  040516  020114  042515
2831  014060  047515  054522  000040
2832
2833  014066  054105  040520  042116  EXPND:  .ASCIZ  /EXPANDED DIAGNOSTIC ROM/
2834  014074  042105  042040  040511
2835  014102  047107  051517  044524
2836  014110  020103  047522  000115
2837
2838  014116  050105  047522  020115  EPRM:   .ASCIZ  /EPROM IN SOCKETS/
2839  014124  047111  051440  041517
2840  014132  042513  051524     000
2841
2842  014137     123  051531  042524  SYSR:   .ASCIZ  /SYSTEM ROM/
2843  014144  020115  047522  000115
2844
2845  014152  054523  052123  046505  SYSE:   .ASCIZ  /SYSTEM EPROM/
2846  014160  042440  051120  046517
2847  014166     000
2848
2849  014167     105  050130  047101  EXADD:  .ASCIZ  /EXPANDED ROM IN 2-4K /
2850  014174  042504  020104  047522
2851  014202  020115  047111  031040
2852  014210  032055  020113     000
2853
2854  014215     105  051120  046517  EPADD:  .ASCIZ  /EPROM IN 4-6K /
2855  014222  044440  020116  026464
2856  014230  045466  000040
2857
```

```
2858  014234  054523  052123  046505  SRR:    .ASCIZ  /SYSTEM ROM START AT 16K/
2859  014242  051040  046517  051440
2860  014250  040524  052122  040440
2861  014256  020124  033061  000113
2862
2863  014264  054523  052123  046505  SYEE:   .ASCIZ  /SYSTEM EPROM START AT 16K/
2864  014272  042440  051120  046517
2865  014300  051440  040524  052122
2866  014306  040440  020124  033061
2867  014314  000113
2868
2869
2870                                          .EVEN
2871  014316                                  ENDTST
2872  014316                          L10065:
2873  014316  104001                          EMT     C$ETST
2874
2875
2876
2877
2878
2879
2880
2881
2882
```

```
                        .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.
                                ;--

014320                                  BGNHRD
014320  000073                          .WORD L10076-L$HARD/2
014322                          L$HARD::

014322                                  GPRMD   UNIT,0,0,160000,0,16,YES
014322  000032                          .WORD   T$CODE
014324  014374                          .WORD   UNIT
014326  160000                          .WORD   160000
014330  000000                          .WORD   T$LOLIM
014332  000016                          .WORD   T$HILIM
014334                                  GPRMD   INTVEC,2,0,-1,66,100,YES
014334  001032                          .WORD   T$CODE
014336  014410                          .WORD   INTVEC
014340  177777                          .WORD   -1
014342  000066                          .WORD   T$LOLIM
014344  000100                          .WORD   T$HILIM
014346                                  GPRMD   PRI,4,0,-1,0,7,YES
014346  002032                          .WORD   T$CODE
014350  014441                          .WORD   PRI
014352  177777                          .WORD   -1
014354  000000                          .WORD   T$LOLIM
014356  000007                          .WORD   T$HILIM
014360                                  GPRMD   RKSW,6,0,-1,0,7777,YES
014360  003032                          .WORD   T$CODE
014362  014461                          .WORD   RKSW
014364  177777                          .WORD   -1
014366  000000                          .WORD   T$LOLIM
014370  007777                          .WORD   T$HILIM

014372                                  EXIT HRD
014372  047004                          .WORD   T$CODE

014374  047125  052111  047040  UNIT:   .ASCIZ  /UNIT NUMBER/
014402  046525  042502  000122
014410  047111  042524  051122  INTVEC: .ASCIZ  /INTERRUPT VECTOR ADDRESS/
014416  050125  020124  042526
014424  052103  051117  040440
014432  042104  042522  051523
014440     000
014441     111  052116  051105  PRI:    .ASCIZ  /INTERRUPT LEVEL/
014446  052522  052120  046040
014454  053105  046105     000
014461     122  041517  042513  RKSW:   .ASCIZ  /ROCKER SWITCH SETTINGS/
014466  020122  053523  052111
```

```
 2943  014474  044103  051440  052105
 2944  014502  044524  043516  000123
 2945                          .EVEN
 2946
 2947  014510                  ENDHRD
 2948                          .EVEN
 2949  014510                  L10076:
```

```
                                .SBTTL  SOFTWARE PARAMETER CODING SECTION

                                ;++
                                ; THE SOFTWARE 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.
                                ;--

014510                                  BGNSFT
014510  000161                          .WORD L10077-L$SOFT/2
014512                          L$SOFT::
014512                                  GPRMD   CKW1,0,0,-1,0,177777,YES
014512  000032                          .WORD   T$CODE
014514  014634                          .WORD   CKW1
014516  177777                          .WORD   -1
014520  000000                          .WORD   T$LOLIM
014522  177777                          .WORD   T$HILIM
014524                                  GPRMD   CKW2,2,0,-1,0,177777,YES
014524  001032                          .WORD   T$CODE
014526  014711                          .WORD   CKW2
014530  177777                          .WORD   -1
014532  000000                          .WORD   T$LOLIM
014534  177777                          .WORD   T$HILIM
014536                                  GPRMD   CKW3,4,0,-1,0,177777,YES
014536  002032                          .WORD   T$CODE
014540  014727                          .WORD   CKW3
014542  177777                          .WORD   -1
014544  000000                          .WORD   T$LOLIM
014546  177777                          .WORD   T$HILIM
014550                                  GPRMD   CKW4,6,0,-1,0,177777,YES
014550  003032                          .WORD   T$CODE
014552  014745                          .WORD   CKW4
014554  177777                          .WORD   -1
014556  000000                          .WORD   T$LOLIM
014560  177777                          .WORD   T$HILIM
014562                                  GPRMD   CKW5,10,0,-1,0,177777,YES
014562  004032                          .WORD   T$CODE
014564  014763                          .WORD   CKW5
014566  177777                          .WORD   -1
014570  000000                          .WORD   T$LOLIM
014572  177777                          .WORD   T$HILIM
014574                                  GPRMD   CKW6,12,0,-1,0,177777,YES
014574  005032                          .WORD   T$CODE
014576  015001                          .WORD   CKW6
014600  177777                          .WORD   -1
014602  000000                          .WORD   T$LOLIM
014604  177777                          .WORD   T$HILIM
014606                                  GPRMD   CKW7,14,0,-1,0,177777,YES
014606  006032                          .WORD   T$CODE
014610  015017                          .WORD   CKW7
014612  177777                          .WORD   -1
014614  000000                          .WORD   T$LOLIM
014616  177777                          .WORD   T$HILIM
```

```
3006  014620                                  GPRMD   CKW8,16,0,-1,0,177777,YES
3007  014620  007032                          .WORD   T$CODE
3008  014622  015035                          .WORD   CKW8
3009  014624  177777                          .WORD   -1
3010  014626  000000                          .WORD   T$LOLIM
3011  014630  177777                          .WORD   T$HILIM
3012
3013  014632                                  EXIT SFT
3014  014632  111004                          .WORD   T$CODE
3015
3016  014634  044103  041505  053513  CKW1:   .ASCIZ  /CHECKWORDS FOR DIAGNOSTIC ROM.  CHECKWORD 1: /
3017  014642  051117  051504  043040
3018  014650  051117  042040  040511
3019  014656  047107  051517  044524
3020  014664  020103  047522  027115
3021  014672  041440  042510  045503
3022  014700  047527  042122  030440
3023  014706  020072     000
3024  014711     103  042510  045503  CKW2:   .ASCIZ  /CHECKWORD 2: /
3025  014716  047527  042122  031040
3026  014724  020072     000
3027  014727     103  042510  045503  CKW3:   .ASCIZ  /CHECKWORD 3: /
3028  014734  047527  042122  031440
3029  014742  020072     000
3030  014745     103  042510  045503  CKW4:   .ASCIZ  /CHECKWORD 4: /
3031  014752  047527  042122  032040
3032  014760  020072     000
3033  014763     103  042510  045503  CKW5:   .ASCIZ  /CHECKWORD 5: /
3034  014770  047527  042122  032440
3035  014776  020072     000
3036  015001     103  042510  045503  CKW6:   .ASCIZ  /CHECKWORD 6: /
3037  015006  047527  042122  033040
3038  015014  020072     000
3039  015017     103  042510  045503  CKW7:   .ASCIZ  /CHECKWORD 7: /
3040  015024  047527  042122  033440
3041  015032  020072     000
3042  015035     103  042510  045503  CKW8:   .ASCIZ  /CHECKWORD 8: /
3043  015042  047527  042122  034040
3044  015050  020072     000
3045          015054                          .EVEN
3046
3047
3048  015054                                  ENDSFT
3049                                          .EVEN
3050  015054                          L10077:
3051
3052  015054                                  LASTAD
3053                                          .EVEN
3054  015054                          L$LAST::
```

```
3055                                    .TITLE  PDP-11 DIAGNOSTIC SUPERVISOR
3056                                    END.SUPV=.+2
                                        .=71776
                                        .WORD   0
                                        X1X1=.
                                        .END 200
```

045754
071776
071776 000000
072000
000200

```
ABOFLA  015326 G        3056#*
ABOPAS  015240 G        3056#*
ABO.FM  020202          3056#
ACTSUM  002172           623#    960*    964*   1069    1086    2104    2134
ADDON   013530          1228*   2330*   2347   2352    2754#
ADDTL   012546          2540#   2549    2555   2561
ALLOC   035772          3056#
ANSR    002164           620#   1229*   2414   2419    2421*   2496    2501    2503*   2586    2591    2593*   2675    2680
                        2682*
A$AAW   022112          3056#
A$AAX   022126          3056#
A$AAY   022134          3056#
A$AAZ   022150          3056#
A$ABA   022160          3056#
BCF     002154           616#    959     962    1063*   1076*   2090*   2120*   2447    2529    2619    2708
BDDAT   003144           745#    852
BEVENT  007124 G        1787#
BEVREG= 177546          1719#   1735*   1760*
BGN.SU= 015054          3056#
BINMSG  034302          3056#
BITO  = 000001 G         563#   1939    1961    1975
BITOO = 000001 G         552#    563
BIT01 = 000002 G         551#    562
BIT02 = 000004 G         550#    561
BIT03 = 000010 G         549#    560
BIT04 = 000020 G         548#    559
BIT05 = 000040 G         547#    558
BIT06 = 000100 G         546#    557    1735    1760
BIT07 = 000200 G         545#    556
BIT08 = 000400 G         544#    555
BIT09 = 001000 G         543#    554                    ....
BIT1  = 000002 G         562#
BIT10 = 002000 G         542#
BIT11 = 004000 G         541#
BIT12 = 010000 G         540#
BIT13 = 020000 G         539#
BIT14 = 040000 G         538#
BIT15 = 100000 G         537#   1428    1453    1657    1682    1941
BIT2  = 000004 G         561#
BIT3  = 000010 G         560#
BIT4  = 000020 G         559#
BIT5  = 000040 G         558#
BIT6  = 000100 G         557#
BIT7  = 000200 G         556#
BIT8  = 000400 G         555#
BIT9  = 001000 G         554#
BLD.MW  022772          3056#
BLOCK   040126          3056#
BVERR1  007134 G        1750    1796#
BVERR2  007202 G        1775    1815#
BYTINS  003207           752#    872
BYTLOC  002230           638#   2449#   2451#   2531#   2533#   2621#   2623#   2710#   2712#   2765
B$AAB   024374          3056#
B$AAF   024306          3056#
CALLPC= 000022          3056#*
CALLPS= 000024          3056#*
```

```
CALLSP= 000026           3056#*
CALLTC= 000030           3056#*
CAL.CL  042510           3056#*
CAL.TI  042546 G         3056#
CHKLUP  024410           3056#
CHKSTR  036334           3056#
CHKSUM  004122            958#   1067    1084    2102    2132
CHKTTY  034422           3056#
CHK.FO  016620           3056#
CHK.MA  022550           3056#
CHK.PC  027636           3056#*
CHK.SW  016342           3056#
CHRCNT  035654           3056#*
CH.FLA  022252           3056#
CH.PAS  022274           3056#
CKERR   002624            684#   2193    2219
CKSME   013544 G         2469    2548    2637    2726    2763#
CKWD    002216            633#   1096    1099    2440*   2522*   2612*   2701*
CKW1    014634           2966    3016#
CKW2    014711           2972    3024#
CKW3    014727           2978    3027#
CKW4    014745           2984    3030#
CKW5    014763           2990    3033#
CKW6    015001           2996    3036#
CKW7    015017           3002    3039#
CKW8    015035           3008    3042#
CLEAR.  023672           3056#
CLKACC  015236 G         3056#*
CLKBFR  042512           3056#*
CLKCNT  015234 G         3056#*
CLKRES  044110 G         3056#
CLKSER  044410 G         3056#
CLKSON  015300 G         3056#*
CLK.SE  022352           3056#
CLR.MA  022626           3056#
CNVT    040566           3056#
COMMTA  040406           3056#
CONT    013436           2706    2716#
CONTCL  044170 G         3056#
COUNTR  002162            619#   2087*   2165*   2439*   2456*   2521*   2538*   2611*   2628*   2700*   2717*
CRLF    034504           3056#
CURR.T  015254 G         3056#*
CWDERR  002643            688#
CWKDE   013602 G         2475    2554    2643    2734    2778#
C$AAD   027610           3056#
C$AAE   027622           3056#
C$AAK   030440           3056#
C$AAL   030550           3056#
C$ABRT= 000021            359#
C$ADR = 000020            359#   1267    1288    1309    1330    1349    1370    1391    1412    1437    1464    1495    1516
                         1538    1559    1580    1600    1620    1641    1666    1693    2466    2472    2478    2545    2551
                         2557    2634    2640    2646    2723    2731    2739
C$AU  = 000054            359#
C$BRK = 000022            359#
C$BSEG= 000004            359#
C$BSUB= 000002            359#   1261    1281    1302    1323    1344    1363    1384    1405    1426    1451    1489    1509
```

```
                    1531    1552    1573    1593    1613    1634    1655    1680    1727    1759    2055    2119    2148
                    2163    2325    2406    2488    2567    2656
C$BUFF= 000030       359#
C$CEFG= 000046       359#
C$CLEA= 000012       359#    1244
C$CLP1= 000006       359#    1042    1275    1296    1317    1338    1357    1378    1399    1420    1445    1472    1503
                    1524    1546    1567    1588    1608    1628    1649    1674    1701    1752    1777    1932    2101
                    2112    2131    2142    2156
C$CVEC= 000036       359#    1234
C$DCLN= 000044       359#
C$DODU= 000053       359#
C$DRPT= 000024       359#
C$DU  = 000055       359#
C$EDIT= 000006       359#     395
C$ERDF= 000002       359#    1038    1267    1288    1309    1330    1349    1370    1391    1412    1437    1464    1495
                    1516    1538    1559    1580    1600    1620    1641    1666    1693    1748    1773    1928    2094
                    2108    2124    2138    2152    2466    2472    2478    2545    2551    2557    2634    2640    2646
                    2723    2731    2739
C$ERHR= 000003       359#
C$ERSF= 000001       359#
C$ERSO= 000004       359#
C$ESCA= 000010       359#
C$ESEG= 000005       359#
C$ESUB= 000003       359#    1278    1299    1320    1341    1360    1381    1402    1423    1448    1475    1506    1527
                    1549    1570    1591    1611    1631    1652    1677    1704    1756    1781    2115    2145    2159
                    2169    2402    2485    2564    2653    2748
C$ETST= 000001       359#    1479    1707    1859    1908    2043    2297    2873
C$EXIT= 000032       359#    1198    1237    1272    1293    1314    1335    1354    1375    1396    1417    1442    1469
                    1500    1521    1543    1564    1585    1605    1625    1646    1671    1698    1724    1783    1883
                    1903    1934    1996    2098    2128    2172    2398    2463    2631    2720    2728    2736    2744
                    2751
C$GMAN= 000043       359#     985    2063    2075    2345    2355    2365    2376    2387    2412    2423    2494    2505
                    2570    2584    2595    2659    2673    2684
C$GPHR= 000042       359#    1178
C$GPRI= 000040       359#
C$GTIM= 000052       359#
C$INIT= 000011       359#    1213,
C$INLP= 000020       359#
C$KWOF= 000035       359#
C$KWON= 000034       359#
C$LOOP= 000100       359#    1267    1288    1309    1330    1349    1370    1391    1412    1437    1464    1495    1516
                    1538    1559    1580    1600    1620    1641    1666    1693    1748    1773    2094    2108    2124
                    2138    2152    2466    2472    2478    2545    2551    2557    2634    2640    2646    2723    2731
                    2739
C$MANI= 000051       359#    1187    1877    1922    2057    2327
C$MSG = 000023       359#     827     847     867     887     899     911     923    1812    1831    2015    2188    2201
                    2214    2227    2240    2775    2789    2803
C$PNTB= 000014       359#     815     835     855     875     895     907     919    1801    1808    1820    1827    2011
                    2184    2197    2210    2223    2235    2769    2783    2797
C$PNTF= 000017       359#     933     982    1194    1956    1968    1982    1992
C$PNTS= 000016       359#
C$PNTX= 000015       359#     823     843     863     883
C$POIN= 000040       359#    1038    1267    1288    1309    1330    1349    1370    1391    1412    1437    1464    1495
                    1516    1538    1559    1580    1600    1620    1641    1666    1693    1748    1773    1928    2094
                    2108    2124    2138    2152    2466    2472    2478    2545    2551    2557    2634    2640    2646
                    2723    2731    2739
```

```
C$QIO = 000377            359#
C$RDBU= 000007            359#
C$REFG= 000050            359#
C$REQT= 000045            359#
C$RESE= 000033            359#
C$REVI= 000001            359#    394
C$RPT = 000025            359#   1164
C$SEFG= 000047            359#
C$SPRI= 000041            359#   1185    1738    1744    1763    1769
C$SVEC= 000037            359#   1733
C$TPRI= 000013            359#
C$UNBU= 000031            359#
C$WTM = 000026            359#   1871    1875    1889    1893    1897    1901
C$WTU = 000027            359#   1741    1766
DADDR   011473           2067    2290#
DATOUT  012174           2450    2452#
DECMSG  034316           3056#
DERR1   010750 G         2096    2178#
DERR2   010776 G         2110    2191#
DERR3   011024 G         2126    2204#
DERR4   011052 G         2140    2217#
DERR5   011100 G         2154    2230#
DEVDAT  002502 G          655#
DFLTST  011750           2329    2342    2353    2395    2397#
DFPTBL  002122 G          481#
DIAGER  003376            776#    916
DIAG.T  015334 G         3056#*
DIAIN   011624           2354#
DLOOP   010514           2090#   2166
DPDVD   045120 G         3056#
DPMUL   045006 G         3056#
DRLP    010746           2072*   2085*   2086    2175#
DRTST   010474           2087#
DSPCOD  002100 G          457#
DUNIT.  015244 G         3056#*
DVC.FT  030410           3056#
D$AAG   031260           3056#
D$AAH   031276           3056#
D$AAI   034050           3056#
D$AAJ   034054           3056#
D$AAK   034072           3056#
D$AAL   034110           3056#
D$AAM   034120           3056#
EF.CON= 000036 G          571#
EF.NEW= 000035 G          572#
EF.PWR= 000034 G          573#
EF.RES= 000037 G          570#
EF.STA= 000040 G          569#
EF01  = 000001 G          590#
EF02  = 000002 G          589#
EF03  = 000003 G          588#
EF04  = 000004 G          587#
EF05  = 000005 G          586#
EF06  = 000006 G          585#
EF07  = 000007 G          584#
EF08  = 000010 G          583#
```

```
EF09  = 000011 G          582#
EF10  = 000012 G          581#
EF11  = 000013 G          580#
EF12  = 000014 G          579#
EF13  = 000015 G          578#
EF14  = 000016 G          577#
EF15  = 000017 G          576#
EF16  = 000020 G          575#
EMT.TR  015332 G         3056#*
END.OF  023660           3056#
END.SU= 045754           3056#
EOP.CH  044432 G         3056#
EOP.FM  020216           3056#
EOP.IN  022270           3056#*
EPADD   014215           2498    2854#
EPRIN   011646           2364#   2460
EPRM    014116           2369    2547    2553    2559    2838#
EPRMT   012306           2374    2489#
EPROM   002254            641#   2491    2520
EPRTST  012444           2522#   2539
ERM5    013666           2780    2805#
ERM6    013716           2766    2810#
ERRFLG  002232            639#   1072*   1089*   1101*   2407*   2444    2452    2489*   2526    2534    2568*   2616    2624
                         2657*   2705    2713
ERRFOR  030626           3056#
ERRHAN  027642           3056#
ERR.HR  030420           3056#
ERR.SF  030424           3056#
ERR1FO  030712           3056#
ESC.PC  027634           3056#*
EXADD   014167           2416    2849#
EXEC    014037           2349    2828#
EXPDIA  002234            640#   2409    2438
EXPND   014066           2359    2468    2474    2480    2833#
EXPROM  011760           2363    2407#
EXPSUM  002170            622#   1068*   1069*   1070    1085*   1086*   1087    2103*   2104*   2105    2133*   2134*   2135
EXPTST  012120           2440#   2457
E1      012244           2453    2465#
E10     013134           2626    2639#
E11     013146           2615    2645#
E12     013456           2714    2722#
E13     013472           2715    2730#
E14     013506           2704    2738#
E2      012256           2454    2471#
E3      012270           2443    2477#
E4      012564           2535    2544#
E5      012576           2536    2550#
E6      012610           2525    2556#
E7      013122           2625    2633#
FILL    035152           3056#
FILL.C  000204 G         3056#
FLAGS   015276 G         3056#*
FLAGTA  040324           3056#
FLAG.I  022336           3056#
FLA.SE  040272           3056#
FLG.MA  022276           3056#
```

```
FORM.T  030722          3056#*
FREE    036230          3056#
F$AU  = 000015           359#
F$BGN = 000040           359#    369    448    457    469    532    607    615    644    810    830    850    870
                         890    902    914   1161   1175   1198   1222   1237   1259   1261   1272   1277   1281
                        1293   1298   1302   1314   1319   1323   1335   1340   1344   1354   1359   1363   1375
                        1380   1384   1396   1401   1405   1417   1422   1426   1442   1447   1451   1469   1474
                        1478   1487   1489   1500   1505   1509   1521   1526   1531   1543   1548   1552   1564
                        1569   1573   1585   1590   1593   1605   1610   1613   1625   1630   1634   1646   1651
                        1655   1671   1676   1680   1698   1703   1706   1718   1724   1727   1755   1759   1780
                        1783   1787   1796   1815   1858   1867   1883   1903   1907   1920   1934   1996   2004
                        2042   2053   2055   2098   2114   2119   2128   2144   2148   2158   2163   2168   2172
                        2178   2191   2204   2217   2230   2296   2323   2325   2398   2401   2406   2463   2484
                        2488   2563   2567   2631   2652   2656   2720   2728   2736   2744   2747   2751   2763
                        2778   2792   2872   2900   2929   2962   3014
F$CLEA= 000007           359#   1222   1243
F$DU  = 000016           359#
F$END = 000041           359#    369    448    457    469    532    607    615    644    828    848    868    888
                         900    912    924   1165   1198   1214   1237   1245   1259   1261   1272   1277   1279
                        1281   1293   1298   1300   1302   1314   1319   1321   1323   1335   1340   1342   1344
                        1354   1359   1361   1363   1375   1380   1382   1384   1396   1401   1403   1405   1417
                        1422   1424   1426   1442   1447   1449   1451   1469   1474   1476   1478   1480   1487
                        1489   1500   1505   1507   1509   1521   1526   1528   1531   1543   1548   1550   1552
                        1564   1569   1571   1573   1585   1590   1592   1593   1605   1610   1612   1613   1625
                        1630   1632   1634   1646   1651   1653   1655   1671   1676   1678   1680   1698   1703
                        1705   1706   1708   1718   1724   1727   1755   1757   1759   1780   1782   1783   1792
                        1813   1832   1858   1860   1867   1883   1903   1907   1909   1920   1934   1996   2016
                        2042   2044   2053   2055   2098   2114   2116   2119   2128   2144   2146   2148   2158
                        2160   2163   2168   2170   2172   2189   2202   2215   2228   2241   2296   2298   2323
                        2325   2398   2401   2403   2406   2463   2484   2486   2488   2563   2565   2567   2631
                        2652   2654   2656   2720   2728   2736   2744   2747   2749   2751   2776   2790   2804
                        2872   2874   2929   2950   3014   3051
F$HARD= 000004           359#   2900   2929   2948   3014
F$HW  = 000013           359#    479    490
F$INIT= 000006           359#   1175   1212
F$JMP = 000050           359#   1198   1237   1272   1293   1314   1335   1354   1375   1396   1417   1442   1469
                        1500   1521   1543   1564   1585   1605   1625   1646   1671   1698   1724   1783   1883
                        1903   1934   1996   2098   2128   2172   2398   2463   2631   2720   2728   2736   2744
                        2751   2929   3014
F$MOD = 000000           359#    370    448    458    469    533    607    616    644
F$MSG = 000011           359#    810    826    830    846    850    866    870    886    890    898    902    910
                         914    922   1796   1811   1815   1830   2004   2014   2178   2187   2191   2200   2204
                        2213   2217   2226   2230   2239   2763   2774   2778   2788   2792   2802
F$PWR = 000017           359#
F$RPT = 000012           359#   1161   1163
F$SEG = 000003           359#
F$SOFT= 000005           359#   2962   3014   3049
F$SRV = 000010           359#   1787   1790
F$SUB = 000002           359#   1261   1277   1281   1298   1302   1319   1323   1340   1344   1359   1363   1380
                        1384   1401   1405   1422   1426   1447   1451   1474   1489   1505   1509   1526   1531
                        1548   1552   1569   1573   1590   1593   1610   1613   1630   1634   1651   1655   1676
                        1680   1703   1727   1755   1759   1780   2055   2114   2119   2144   2148   2158   2163
                        2168   2325   2401   2406   2484   2488   2563   2567   2652   2656   2747
F$SW  = 000014           359#    500    517
F$TEST= 000001           359#   1259   1478   1487   1706   1718   1858   1867   1907   1920   2042   2053   2296
                        2323   2872
```

```
GARBAG  035656          3056#
GET     011602          2332    2344#
GETAD   010434          2071    2074#
GETCHR  034362          3056#
GETCMN  037746          3056#
GETPAR  031440          3056#
GETSWI  036742          3056#
GET.TW  036512          3056#
GLBDAT  002154 G         615#
GLBEQA  002154 G         532#
G$EXCP= 000400           359#
G$HILI= 000002           359#
G$LOLI= 000001           359#
G$NO  = 000000           359#    988    2078    2358    2368    2379    2390    2426    2508    2573    2598    2662    2687
G$OFFS= 000400           359#    988    2066    2078    2348    2358    2368    2379    2390    2415    2426    2497    2508
                        2573    2587    2598    2662    2676    2687    2904    2910    2916    2922    2965    2971    2977
                        2983    2989    2995    3001    3007
G$OFSI= 000376           359#    988    2066    2078    2348    2358    2368    2379    2390    2415    2426    2497    2508
                        2573    2587    2598    2662    2676    2687    2904    2910    2916    2922    2965    2971    2977
                        2983    2989    2995    3001    3007
G$PRMA= 000001           359#
G$PRMD= 000002           359#    988    2078    2426    2508    2573    2598    2662    2687    2904    2910    2916    2922
                        2965    2971    2977    2983    2989    2995    3001    3007
G$PRML= 000000           359#    2066    2348    2358    2368    2379    2390    2415    2497    2587    2676
G$RADA= 000140           359#
G$RADB= 000000           359#
G$RADD= 000040           359#    2078    2426    2508    2573    2598    2662    2687
G$RADF= 000200           359#
G$RADL= 000120           359#    2066    2348    2358    2368    2379    2390    2415    2497    2587    2676
G$RADO= 000020           359#    988    2904    2910    2916    2922    2965    2971    2977    2983    2989    2995    3001
                        3007
G$RADT= 000100           359#
G$XFER= 000004           359#    2929    3014
G$YES = 000010           359#    2066    2348    2415    2497    2587    2676    2904    2910    2916    2922    2965    2971
                        2977    2983    2989    2995    3001    3007
HBYTE   013416          2709    2712#
HCORED  022034          3056#
HCOREQ  021714          3056#
HCORET  015266 G        3056#*
HELP  = 000000             6#    15    19    22    25    76    81    98    106    111    115    134    221
                         225    261    266    285    358    364#    378    449    469    483    504    522#    604
                         658    725    799    938    1138    1140    1142    1144    1146    1148    1150    1152    1153
                        1154    1156#    1197    1209    1235    1240    1248#    2874    2876    2877    2879    2881    2883
                        2885#    2903    2931    3015    3046
HERTZ.  021654          3056#
HIADD   012512          2530    2533#
HIBYT   002731           700#    2451    2533    2623    2712
HIBYTE  004566          1065    1076#
HIGH    012166          2448    2451#
HIGHB   013062          2620    2623#
HIRANG  002226           637#    928    1046*    1047*    1050*
HIROM   011325          2220    2268#
HOLDSP= 000020          3056#
HRAERR  011251          2207    2259#
H$AAB   041114          3056#
ICOUNT  007132          1745    1753*    1770    1778*    1788*    1793#    1804    1823
```

```
IDENT   005114            1191    1201#
ININIT  015256 G          3056#*
INITIA  034332            3056#
INIT.M  022674            3056#
INIT.R  015070 G          3056#
INLP    004206             984#    997
INPUT   004166             978#   2410    2492    2582    2671
INPUTA  035260            3056#
INSTR   004244             979    1000#
INTCT   007324            1805    1824    1841#
INTFOR  030556            3056#
INTSR   007124            1730    1785#
INTVEC  014410            2911    2933#
INVAL.  022002            3056#
INVINT  030450            3056#
INV.SW  016276            3056#
INWORD  004332             989    1010#
IN.SUF  023644            3056#
I$AU  = 000041             359#
I$CLN = 000041             359#   1222#   1237    1245#
I$DU  = 000041             359#
I$HRD = 000041            2900#   2950#
I$INIT= 000041             359#   1175#   1198    1214#
I$MOD = 000041             359#    369#    448#    457#    469#    532#    607#    615#    644#
I$MSG = 000041             359#    810#    828#    830#    848#    850#    868#    870#    888#    890#    900#    902#    912#
                           914#    924#   1796#   1813#   1815#   1832#   2004#   2016#   2178#   2189#   2191#   2202#   2204#
                          2215#   2217#   2228#   2230#   2241#   2763#   2776#   2778#   2790#   2792#   2804#
I$PWR = 000041             359#
I$RPT = 000041             359#   1161#   1165#
I$SEG = 000041             359#   1259    1261    1281    1302    1323    1344    1363    1384    1405    1426    1451    1487
                          1489    1509    1531    1552    1573    1593    1613    1634    1655    1680    1718    1727    1759
                          1867    1920    2053    2055    2119    2148    2163    2323    2325    2406    2488    2567    2656
I$SFT = 000041            2962#   3051#
I$SRV = 000041             359#   1787#   1792#
I$SUB = 000041             359#   1259    1261#   1277#   1279#   1281#   1298#   1300#   1302#   1319#   1321#   1323#   1340#
                          1342#   1344#   1359#   1361#   1363#   1380#   1382#   1384#   1401#   1403#   1405#   1422#   1424#
                          1426#   1447#   1449#   1451#   1474#   1476#   1487    1489#   1505#   1507#   1509#   1526#   1528#
                          1531#   1548#   1550#   1552#   1569#   1571#   1573#   1590#   1592#   1593#   1610#   1612#   1613#
                          1630#   1632#   1634#   1651#   1653#   1655#   1676#   1678#   1680#   1703#   1705#   1718    1727#
                          1755#   1757#   1759#   1780#   1782#   1867    1920    2053    2055#   2114#   2116#   2119#   2144#
                          2146#   2148#   2158#   2160#   2163#   2168#   2170#   2323    2325#   2401#   2403#   2406#   2463
                          2484#   2486#   2488#   2563#   2565#   2567#   2652#   2654#   2656#   2747#   2749#
I$TST = 000041             359#   1259#   1261    1272    1281    1293    1302    1314    1323    1335    1344    1354    1363
                          1375    1384    1396    1405    1417    1426    1442    1451    1469    1478#   1480#   1487#   1489
                          1500    1509    1521    1531    1543    1552    1564    1573    1585    1593    1605    1613    1625
                          1634    1646    1655    1671    1680    1698    1706#   1708#   1718#   1724    1727    1759    1783
                          1858#   1860#   1867#   1883    1903    1907#   1909#   1920#   1934    1996    2042#   2044#   2053#
                          2055    2098    2119    2128    2148    2163    2172    2296#   2298#   2323#   2325    2398    2406
                          2488    2567    2631    2656    2720    2728    2736    2744    2751    2872#   2874#
J$JMP = 000167             359#
KBPTR   015106 G          3056#*
KBUF    015110 G          3056#*
LD1     012072            2334    2434    2436#
LD2     012420            2337    2516    2518#
LD3     012766            2340    2606    2608#
LD4     013324            2343    2695    2697#
```

```
LINE.F  015330 G        3056#*
LOAD    005006          1123    1132#
LOADR   002774           707#   2079    2427    2509    2599    2688
LOAD.F  022272          3056#*
LOBYT   002667           693#   2449    2531    2621    2710
LOBYTE  004510          1063#
LOD1    013534          2333    2433*   2435*   2436    2756#
LOD2    013536          2335    2515*   2517*   2518    2757#
LOD3    013540          2338    2605*   2607*   2608    2758#
LOD4    013542          2341    2694*   2696*   2697    2759#
LOGMSG  034324          3056#
LOOP    004770          1126#   1130
LOPAG   002160           618#   1132*   1134*   2085    2433    2515    2605    2694
LORANG  002224           636#    929    1045*   1046
LOST    013745          2794    2815#
LOWROM  011202          2194    2251#
LP      007662          1939#   1946
LPADD   004364          1027#   1033    1044
LPBFR   015104 G        3056#*
LPCNTR  015102 G        3056#*
LPT.AD  021672          3056#
LPT.RE  021666          3056#
LRAERR  011126          2181    2242#
LSI.RE  021662          3056#
LSREG = 177524           605#   1868*   1872*   1886*   1890*   1894*   1898*   1925    1936    2006
LUP     042414          3056#
LUP.AD  027640          3056#*
LSAUT   002070 G         439#
LSCCP   002044 G         419#
LSCLEA  005170 G         420    1222#
LSDEPO  002011 G         391#
LSDEVP  002052 G         425#
LSDISP  002102 G         416     460#
LSDR    002476 G         434     650#
LSDRCT  002062 G         433#
LSDRS   002064 G         435#
LSDRST  002502 G         436     654#
LSDTP   002040 G         415#
LSDUT   002072 G         441#
LSDVTY  003026 G         426     720#
LSEF    002024 G         404#
LSEXP1  002032 G         409#
LSEXP2  002034 G         411#
LSEXP3  002036 G         413#
LSHARD  014322 G         422    2900    2901#
LSHPCP  002046 G         421#
LSHPTP  002056 G         429#
LSHW    002122 G         430     479     480#
LSICP   002042 G         417#
LSINIT  005024 G         418    1175#
LSLADP  002076 G         445#
LSLAST  015054 G         446    3054#
LSMREV  002012 G         393#
LSNAME  002000 G         380#
LSREPP  002054 G         427#
LSREV   002010 G         389#
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L$RPT   005022 G          1161#
L$SOFT  014512 G           424    2962    2963#
L$SPC   002030 G           407#
L$SPCP  002050 G           423#
L$SPTP  002060 G           431#
L$STA   002066 G           437#
L$SW    002134 G           432     500     501#
L$TIML  002022 G           402#
L$TIMU  002020 G           400#
L$TIM1  002016 G           398#
L$TSTI  002074 G           443#
L$UNIT  002014 G           396#
L.CLK.  021640            3056#
L10000  002132             479    490#
L10001  002154             500    517#
L10002  003620             826#
L10003  003666             846#
L10004  003734             866#
L10005  004002             886#
L10006  004024             898#
L10007  004046             910#
L10010  004070             922#
L10011  005022            1163#
L10012  005166            1199   1212#
L10013  005246            1238   1243#
L10014  006066            1273   1294    1315    1336    1355    1376    1397    1418    1443    1470    1478#
L10015  005304            1277#
L10016  005354            1298#
L10017  005424            1319#
L10020  005472            1340#
L10021  005530            1359#
L10022  005600            1380#
L10023  005646            1401#
L10024  005714            1422#
L10025  005774            1447#
L10026  006064            1474#
L10027  006716            1501   1522    1544    1565    1586    1606    1626    1647    1672    1699    1706#
L10030  006124            1505#
L10031  006174            1526#
L10032  006244            1548#
L10033  006312            1569#
L10034  006360            1590#
L10035  006430            1610#
L10036  006476            1630#
L10037  006544            1651#
L10040  006624            1676#
L10041  006714            1703#
L10042  007450            1725   1784    1858#
L10043  007036            1755#
L10044  007116            1780#
L10045  007130            1790#
L10046  007200            1811#
L10047  007246            1830#
L10050  007610            1884   1904    1907#
L10051  010364            1935   1997    2042#
L10052  010164            2014#
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L10053  011514            2099    2129    2173    2296#
L10054  010602            2114#
L10055  010676            2144#
L10056  010720            2158#
L10057  010740            2168#
L10060  010774            2187#
L10061  011022            2200#
L10062  011050            2213#
L10063  011076            2226#
L10064  011124            2239#
L10065  014316            2399    2632    2721    2729    2737    2745    2752    2872#
L10066  011754            2401#
L10067  012302            2464    2484#
L10070  012622            2563#
L10071  013160            2652#
L10072  013522            2747#
L10073  013600            2774#
L10074  013632            2788#
L10075  013664            2802#
L10076  014510            2900    2929    2949#
L10077  015054            2962    3014    3050#
MAJ.IN  015060 G          3056#*
MAJ.LO  042514            3056#*
MAJ.US  015062 G          3056#*
MAN.TI  017362            3056#
MAP16   045356 G          3056#
MASK.B  024406            3056#
MASK.W  024404            3056#
MDHEDR  002000 G           369#
MEMTST  004504            1062#   2441    2523    2613    2702
MEM.SI  021702            3056#
MESSG1  010217            1965    2022#
MESSG2  010232            1979    2024#
MIN.IN  015054 G          3056#*
MIN.US  015056 G          3056#*
MISTAK  011375            2232    2276#
MODR    044720 G          3056#
MORE    012222            2458#   2470    2476    2482
MSGOUT  013070            2622    2624#
MSG1    007250            1798    1833#
MSG2    007373            1817    1848#
MUL     044654 G          3056#
NEWLIN  010245            1989    2026#
NEWPRI  044400 G          3056#
NEXT    013116            2630#   2638    2644    2650
NEXTAR  040510            3056#
NODR    011447            2180    2206    2285#
NOERR   012206            2445    2455#
NONE    012532            2527    2537#
NONXT   013634 G          2481    2560    2649    2742    2792#
NO.CLK  017412            3056#
NO.FLA  040304            3056#
NO.LPT  035622            3056#
NO.PTA  022102            3056#
NR    = 000001             649#
NUMBIN  030746            3056#
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NUM.LA  031114            3056#
NUM.UN  015452            3056#
NUNITS  024362            3056#
NXTFOR  040560            3056#
OCTMSG  034310            3056#
ONERR   003102             738#    832
OUT     005110            1189    1196#
OUTPUT  004452            1028    1045#
O$APTS= 000000             359#    437
O$AU  = 000000             359#    439
O$BGNR= 000000             359#    427
O$BGNS= 000001             359#    377#    423
O$DU  = 000000             359#    441
O$GNSW= 000001             359#    377#    431
O$POIN= 000001             359#    377#    447
O.ODT = ****** U          3056
PACR    002556             676#   1497    1518    1540    1561    1582    1602    1622    1643    1668    1695
PAGE    002202             627#   1026*   1027
PAGERR  004050 G           914#   1040
PARSES  040020            3056#
PAR.LA  034012            3056#
PASCT   002176             625#   1231*   1880    1885*
PASS    002174             624#   1230*   1721    2060    2331    2458    2540
PASSED  013102            2617    2627#
PCR   = 177520             604#   1026    1224*   1490*   1493    1510*   1511    1514    1532*   1533    1536    1553*   1554
                          1557    1574*   1575    1578    1594*   1595    1598    1614*   1615    1618    1635*   1636    1639
                          1656*   1657*   1658    1659    1663*   1681*   1682*   1683    1684    1687*   2086*   2164*   2436*
                          2455*   2518*   2537*   2608*   2627*   2697*   2716*
PGCT    013532            2579*   2611    2668*   2700    2755#
PRI     014441            2917    2938#
PRIN    013424            2711    2713#
PRINTC  035632            3056#
PRINTF  041134            3056#
PRIOR   002214             632#   1181*
PRIOUT  012520            2532    2534#
PRIO0 = 000000 G           602#   1737    1762
PRIO1 = 000040 G           601#
PRIO2 = 000100 G           600#
PRIO3 = 000140 G           599#
PRIO4 = 000200 G           598#
PRIO5 = 000240 G           597#
PRIO6 = 000300 G           596#
PRIO7 = 000340 G           595#   1184    1729    1743    1768
PRNTST  035522            3056#
PRO.CM  022244            3056#*
PRTSW   007642            1924    1936#
PTAB.S  015264 G          3056#
PUTCHR  034336            3056#
PWR.FA  045612 G          3056#
PWR.FL  015066 G          3056#*
PWR.MS  045740            3056#
PWR.SA  045734            3056#*
PWR.UP  045736            3056#*
P.CLK.  021646            3056#
P1      011556            2336    2338#   2461
P2      011570            2339    2341#   2543
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READN   010166          1953    2017#
READ.P  042516 G        3056#
REAL    002156           617#   1062*   1066*   1079    1081*   1083*   1092    1094    2442    2524    2614    2703
REGBAC  045342 G        3056#
REGDT   003510           791#    820     840     860     880
REGMSK  002476 G         651#
REGSAV  045326 G        3056#
REQN.P  022254          3056#*
REQN.T  022246          3056#*
RERR1   003554 G         810#   1270    1498
RERR2   003622 G         830#   1291    1519
RERR3   003670 G         850#   1312    1373    1541    1603
RERR4   003736 G         870#   1333    1352    1394    1415    1562    1583    1623    1644
RERR5   004004 G         890#   1440    1669
RERR6   004026 G         902#   1467    1696
RESPND  002220           634#   1227*   2357    2362    2367    2372    2378    2383    2389    2394    2572    2579    2580
                        2661    2668    2669
RE.SET  016444          3056#
RFLAG   002166           621#   1048    2089*   2437*   2519*   2609*   2698*
RKSW    014461          2923    2941#
ROTLP1  005736          1430#   1435
ROTLP2  006020          1455#   1461
ROTLP3  006566          1659#   1664
ROTLP4  006650          1684#   1690
ROT0    003324           768#    904
ROT1    003254           760#    892
RSET    002222           635#   1226*   2065    2070
RSTACK  044602 G        3056#
RSTRT   010466          2061    2073    2086#
RSX.FL  022266          3056#
RWDCT   013775          2574    2663    2821#
RWR     002512           669#   1269    1290    1311    1332    1351    1372    1393    1414    1439    1466
RWREG = 177522          1225*   1256#   1262*   1265    1282*   1283    1286    1303*   1304    1307    1324*   1325    1328
                        1345*   1346    1364*   1365    1368    1385*   1386    1389    1406*   1407    1410    1427*   1428*
                        1429    1430    1434*   1452*   1453*   1454    1455    1458*
SEARCH  036460          3056#
SEGSTA  015302 G        3056#*
SERR1   010250          2008    2027#
SETADR  004732          1115#   2084    2432    2514    2604    2693
SET.MA  022462          3056#
SFPTBL  002134 G         502#   2088
SHIFT   045440 G        3056#
SIZE.C  044316 G        3056#
SIZE.M  044234 G        3056#
SIZ.TR  044374          3056#
SPEC.U  022172          3056#*
SPV.SE  016674          3056#
SRR     014234          2588    2858#
STARTC  044164 G        3056#
STORE   002210           630#    987     994     1115    2077    2425    2507    2597    2686
STRCHR  035212          3056#
STREQ.  022014          3056#
STRT    010424          2059    2072#
STRT.T  022250          3056#*
ST.REQ  022170          3056#*
ST.SET  016514          3056#
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SUNIT.  022256          3056#
SUPERV  020234          3056#
SUPFLA  015242 G        3056#*
SUPV.T  015420 G        3056#*
SUP.PR  016266          3056#
SVCCNT= 177777           359#   370   448   458   469   479   490   500   517   533   607   616   644
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                         922    994  1161  1163  1175  1212  1222  1243  1259  1261  1277  1281  1298
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                        1447   1451  1474  1478  1487  1489  1505  1509  1526  1531  1548  1552  1569
                        1573   1590  1593  1610  1613  1630  1634  1651  1655  1676  1680  1703  1706
                        1718   1727  1755  1759  1780  1787  1790  1796  1811  1815  1830  1858  1867
                        1907   1920  2004  2014  2042  2053  2055  2070  2084  2114  2119  2144  2148
                        2158   2163  2168  2178  2187  2191  2200  2204  2213  2217  2226  2230  2239
                        2296   2323  2325  2352  2362  2372  2383  2394  2401  2406  2419  2432  2484
                        2488   2501  2514  2563  2567  2579  2591  2604  2652  2656  2668  2680  2693
                        2747   2763  2774  2778  2788  2792  2802  2872  2900  2948  2962  3049
SVCGBL= 000000           359#   360#   369   370   380   381   389   390   391   392   393   394   396
                         397    398   399   400   401   402   403   404   405   407   408   409   410
                         411    412   413   414   415   416   417   418   419   420   421   422   423
                         424    425   426   427   428   429   430   431   432   433   434   435   436
                         437    438   439   440   441   442   443   444   445   446   457   458   460
                         461    480   481   482   501   502   503   532   533   615   616   650   651
                         652    654   655   656   720   721   810   811   830   831   850   851   870
                         871    890   891   902   903   914   915  1161  1162  1175  1176  1222  1223
                        1787   1788  1796  1797  1815  1816  2004  2005  2178  2179  2191  2192  2204
                        2205   2217  2218  2230  2231  2763  2764  2778  2779  2792  2793  2901  2902
                        2963   2964  3054#  3055
SVCHAN  024566          3056#
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                         419    420   421   422   423   424   425   426   427   428   429   430   431
                         432    433   434   435   436   437   438   439   440   441   442   443   444
                         445    446   447   459   460   461   462   463   464   465   466   467   468
                         479    480   500   501   649   650   652   653   654   656   657   721   723
                         724    812   813   814   815   816   817   818   819   820   821   822   823
                         824    825   827   828   832   833   834   835   836   837   838   839   840
                         841    842   843   844   845   847   848   852   853   854   855   856   857
                         858    859   860   861   862   863   864   865   867   868   872   873   874
                         875    876   877   878   879   880   881   882   883   884   885   887   888
                         892    893   894   895   896   897   899   900   904   905   906   907   908
                         909    911   912   916   917   918   919   920   921   923   924   928   929
                         930    931   932   933   934   935   979   980   981   982   983   984   985
                         986    987   988   989   990   991   992   993  1038  1039  1040  1041  1042
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1905 1908 1909 1922 1923 1924 1925 1928 1929 1930 1931 1932 1933
1934 1935 1936 1952 1953 1954 1955 1956 1957 1958 1964 1965 1966
1967 1968 1969 1970 1978 1979 1980 1981 1982 1983 1984 1989 1990
1991 1992 1993 1994 1996 1997 1998 2006 2007 2008 2009 2010 2011
2012 2013 2015 2016 2043 2044 2055 2056 2057 2058 2059 2060 2063
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                3009    3010    3011    3012    3014    3015    3049    3050    3053    3054
SVCSTK= 177777   359#    370     448     458     469     479     490     500     517     533     607     616     644
                 810     826     830     846     850     866     870     886     890     898     902     910     914
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                1590    1593    1610    1613    1630    1634    1651    1655    1676    1680    1703    1706    1718
                1727    1755    1759    1780    1787    1790    1796    1811    1815    1830    1858    1867    1907
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                2401    2406    2484    2488    2563    2567    2652    2656    2747    2763    2774    2778    2788
                2792    2802    2872    2900    2929    2948    2962    3014    3049
SVCSUB= 177777   359#    1261    1281    1302    1323    1344    1363    1384    1405    1426    1451    1489    1509
                1531    1552    1573    1593    1613    1634    1655    1680    1727    1759    2055    2119    2148
                2163    2325    2406    2488    2567    2656
SVCTAG= 000000   359#    361#    490     491     517     518     826     827     846     847     866     867     886
                 887     898     899     910     911     922     923     993     994    1163    1164    1212    1213
                1243    1244    1277    1278    1298    1299    1319    1320    1340    1341    1359    1360    1380
                1381    1401    1402    1422    1423    1447    1448    1474    1475    1478    1479    1505    1506
                1526    1527    1548    1549    1569    1570    1590    1591    1610    1611    1630    1631    1651
                1652    1676    1677    1703    1704    1706    1707    1755    1756    1780    1781    1790    1791
                1811    1812    1830    1831    1858    1859    1907    1908    2014    2015    2042    2043    2069
                2070    2083    2084    2114    2115    2144    2145    2158    2159    2168    2169    2187    2188
                2200    2201    2213    2214    2226    2227    2239    2240    2296    2297    2351    2352    2361
                2362    2371    2372    2382    2383    2393    2394    2401    2402    2418    2419    2431    2432
                2484    2485    2500    2501    2513    2514    2563    2564    2578    2579    2590    2591    2603
                2604    2652    2653    2667    2668    2679    2680    2692    2693    2747    2748    2774    2775
                2788    2789    2802    2803    2872    2873    2949    2950    3050    3051
SVCTST= 177777   359#    1259    1487    1718    1867    1920    2053    2323
SWCHAN  022074  3056#
SWCHON  010132  1937*   1941*   1943*   1948*   1949*   1950*   1952    1959    2001#
SWCNT   010126  1938*   1945*   1999#
SWERR   010134 G 1930   2004#
SWITCH  040464  3056#
SWSET   002206   629#   1182*   1925    2007
SW.PTA  022060  3056#
SYEE    014264  2677    2863#
SYETST  013350  2701#   2718
SYRTST  013014  2612#   2629
SYSE    014152  2391    2725    2733    2741    2845#
SYSEIN  011722  2384    2386#
SYSET   013164  2396    2657#
SYSR    014137  2380    2636    2642    2648    2842#
SYSRIN  011674  2373    2375#   2542
SYSROM  002274   642#   2581    2610    2670    2699
SYSRT   012626  2385    2568#
SYS.FT  030400  3056#
S$LSYM= 010000   359#    491#    518#    827#    847#    867#    887#    899#    911#    923#    986     993     994#
                1164#   1213#   1244#   1278#   1299#   1320#   1341#   1360#   1381#   1402#   1423#   1448#   1475#
                1479#   1506#   1527#   1549#   1570#   1591#   1611#   1631#   1652#   1677#   1704#   1707#   1756#
                1781#   1791#   1812#   1831#   1859#   1908#   2015#   2043#   2064    2069    2070#   2076    2083
```

```
                    2084#   2115#   2145#   2159#   2169#   2188#   2201#   2214#   2227#   2240#   2297#   2346    2351
                    2352#   2356    2361    2362#   2366    2371    2372#   2377    2382    2383#   2388    2393    2394#
                    2402#   2413    2418    2419#   2424    2431    2432#   2485#   2495    2500    2501#   2506    2513
                    2514#   2564#   2571    2578    2579#   2585    2590    2591#   2596    2603    2604#   2653#   2660
                    2667    2668#   2674    2679    2680#   2685    2692    2693#   2748#   2775#   2789#   2803#   2873#
                    2950#   3051#
TAG1     007772     1961#   1973
TAG2     010022     1962    1970#
TAG3     010040     1975#   1987
TAG4     010070     1976    1984#
TEMP     010130     1936*   1939    1944*   2000#
TERMI    042504     3056#
TERMLI   040312     3056#
TERMTA   034274     3056#
TEST.M   022204     3056#*
TIMFLG   015232 G   3056#*
TIM.CO   015064 G   3056#*
TIM.OP   030720     3056#*
TOO.MA   034254     3056#
TSTCKW   004662     1078    1088    1092#
TST.AB   024520     3056#
TST.TO   016324     3056#
TYPEC    034650     3056#
TYPEPC   030544     3056#
TYPFLA   040166     3056#
TYPLIN   034546     3056#
TYPNUM   034134     3056#
TYPSTR   034566     3056#
TYP.ER   030430     3056#
TY.UNI   023664     3056#
T$ARGC=  000001      381#    382#    383#    384#    385#    386#    387#    812#    816     818#    824     832#    836
                     838#    844     852#    856     858#    864     872#    876     878#    884     892#    896     904#
                     908     916#    920     928#    934     979#    983     1191#   1195    1798#   1802    1804#   1809
                    1817#   1821    1823#   1828    1952#   1957    1964#   1969    1978#   1983    1989#   1993    2006#
                    2012    2180#   2185    2193#   2198    2206#   2211    2219#   2224    2232#   2236    2765#   2770
                    2780#   2784    2794#   2798
T$CODE=  111004      988#   2066#   2078#   2348#   2358#   2368#   2379#   2390#   2415#   2426#   2497#   2508#   2573#
                    2587#   2598#   2662#   2676#   2687#   2904#   2910#   2916#   2922#   2929#   2965#   2971#   2977#
                    2983#   2989#   2995#   3001#   3007#   3014#
T$ERCO=  000162     1038#   1267#   1288#   1309#   1330#   1349#   1370#   1391#   1412#   1437#   1464#   1495#   1516#
                    1538#   1559#   1580#   1600#   1620#   1641#   1666#   1693#   1748#   1773#   1928#   2094#   2108#
                    2124#   2138#   2152#   2466#   2472#   2478#   2545#   2551#   2557#   2634#   2640#   2646#   2723#
                    2731#   2739#
T$ERRN=  000062      359#   1039#   1268#   1289#   1310#   1331#   1350#   1371#   1392#   1413#   1438#   1465#   1496#
                    1517#   1539#   1560#   1581#   1601#   1621#   1642#   1667#   1694#   1749#   1774#   1929#   2095#
                    2109#   2125#   2139#   2153#   2467#   2473#   2479#   2546#   2552#   2558#   2635#   2641#   2647#
                    2724#   2732#   2740#
T$EXCP=  000000      988#    993    2078#   2083    2426#   2431    2508#   2513    2573#   2578    2598#   2603    2662#
                    2667    2687#   2692    2904#   2909    2910#   2915    2916#   2921    2922#   2927    2965#   2970
                    2971#   2976    2977#   2982    2983#   2988    2989#   2994    2995#   3000    3001#   3006    3007#
                    3012
T$FLAG=  000041     1198#   1237#   1272#   1293#   1314#   1335#   1354#   1375#   1396#   1417#   1442#   1469#   1500#
                    1521#   1543#   1564#   1585#   1605#   1625#   1646#   1671#   1698#   1724#   1783#   1883#   1903#
                    1934#   1996#   2098#   2128#   2172#   2398#   2463#   2631#   2720#   2728#   2736#   2744#   2751#
                    2929#   3014#
T$HILI=  177777      988#    992    2078#   2082    2426#   2430    2508#   2512    2573#   2577    2598#   2602    2662#
```

```
                    2666    2687#   2691    2904#   2908    2910#   2914    2916#   2920    2922#   2926    2965#   2969
                    2971#   2975    2977#   2981    2983#   2987    2989#   2993    2995#   2999    3001#   3005    3007#
                    3011
T$LOL1= 000000       988#    991    2078#   2081    2426#   2429    2508#   2511    2573#   2576    2598#   2601    2662#
                    2665    2687#   2690    2904#   2907    2910#   2913    2916#   2919    2922#   2925    2965#   2968
                    2971#   2974    2977#   2980    2983#   2986    2989#   2992    2995#   2998    3001#   3004    3007#
                    3010
T$LSYM= 010000       359#    491     518     827     847     867     887     899     911     923    1164    1213    1244
                    1278    1299    1320    1341    1360    1381    1402    1423    1448    1475    1479    1506    1527
                    1549    1570    1591    1611    1631    1652    1677    1704    1707    1756    1781    1791    1812
                    1831    1859    1908    2015    2043    2115    2145    2159    2169    2188    2201    2214    2227
                    2240    2297    2402    2485    2564    2653    2748    2775    2789    2803    2873    2950    3051
T$MCAL= 177777       1#     359
T$NEST= 177777       359#    370#    448#    458#    469#    479#    490#    500#    517#    533#    607#    616#    644#
                     810#    826#    830#    846#    850#    866#    870#    886#    890#    898#    902#    910#    914#
                     922#   1161#   1163#   1175#   1212#   1222#   1243#   1259#   1261#   1277#   1281#   1298#   1302#
                    1319#   1323#   1340#   1344#   1359#   1363#   1380#   1384#   1401#   1405#   1422#   1426#   1447#
                    1451#   1474#   1478#   1487#   1489#   1505#   1509#   1526#   1531#   1548#   1552#   1569#   1573#
                    1590#   1593#   1610#   1613#   1630#   1634#   1651#   1655#   1676#   1680#   1703#   1706#   1718#
                    1727#   1755#   1759#   1780#   1787#   1790#   1796#   1811#   1815#   1830#   1858#   1867#   1907#
                    1920#   2004#   2014#   2042#   2053#   2055#   2114#   2119#   2144#   2148#   2158#   2163#   2168#
                    2178#   2187#   2191#   2200#   2204#   2213#   2217#   2226#   2230#   2239#   2296#   2323#   2325#
                    2401#   2406#   2484#   2488#   2563#   2567#   2652#   2656#   2747#   2763#   2774#   2778#   2788#
                    2792#   2802#   2872#   2900#   2929    2948#   2962#   3014    3049#
T$NSK0= 000005       370#    448     458#    469     479#    490     500#    517     533#    607     616#    644     810#
                     826     830#    846     850#    866     870#    886     890#    898     902#    910     914#    922
                    1161#   1163    1175#   1212    1222#   1243    1259#   1478    1487#   1706    1718#   1858    1867#
                    1907    1920#   2042    2053#   2296    2323#   2872    2900#   2929    2948    2962#   3014    3049
T$NSK1= 000011      1261#   1277    1281#   1298    1302#   1319    1323#   1340    1344#   1359    1363#   1380    1384#
                    1401    1405#   1422    1426#   1447    1451#   1474    1489#   1505    1509#   1526    1531#   1548
                    1552#   1569    1573#   1590    1593#   1610    1613#   1630    1634#   1651    1655#   1676    1680#
                    1703    1727#   1755    1759#   1780    1787#   1790    1796#   1811    1815#   1830    2004#   2014
                    2055#   2114    2119#   2144    2148#   2158    2163#   2168    2178#   2187    2191#   2200    2204#
                    2213    2217#   2226    2230#   2239    2325#   2401    2406#   2484    2488#   2563    2567#   2652
                    2656#   2747    2763#   2774    2778#   2788    2792#   2802
T$SAVL= 177777       359#
T$SEGL= 177777       359#
T$SUBN= 000005       359#   1259#   1261#   1281#   1302#   1323#   1344#   1363#   1384#   1405#   1426#   1451#   1487#
                    1489#   1509#   1531#   1552#   1573#   1593#   1613#   1634#   1655#   1680#   1718#   1727#   1759#
                    1867#   1920#   2053#   2055#   2119#   2148#   2163#   2323#   2325#   2406#   2488#   2567#   2656#
T$TAGL= 177777       359#
T$TAGN= 010100       359#    479#    500#    810#    830#    850#    870#    890#    902#    914#   1161#   1175#   1222#
                    1259#   1261#   1281#   1302#   1323#   1344#   1363#   1384#   1405#   1426#   1451#   1487#   1489#
                    1509#   1531#   1552#   1573#   1593#   1613#   1634#   1655#   1680#   1718#   1727#   1759#   1787#
                    1796#   1815#   1867#   1920#   2004#   2053#   2055#   2119#   2148#   2163#   2178#   2191#   2204#
                    2217#   2230#   2323#   2325#   2406#   2488#   2567#   2656#   2763#   2778#   2792#   2900#   2962#
T$TEMP= 000005       448#    461#    462#    463#    464#    465#    466#    467#    468#    469#    490#    517#    607#
                     644#    826#    846#    866#    886#    898#    910#    922#    988#   1163#   1198#   1199    1212#
                    1237#   1238    1243#   1272#   1273    1277#   1293#   1294    1298#   1314#   1315    1319#   1335#
                    1336    1340#   1354#   1355    1359#   1375#   1376    1380#   1396#   1397    1401#   1417#   1418
                    1422#   1442#   1443    1447#   1469#   1470    1474#   1478#   1500#   1501    1505#   1521#   1522
                    1526#   1543#   1544    1548#   1564#   1565    1569#   1585#   1586    1590#   1605#   1606    1610#
                    1625#   1626    1630#   1646#   1647    1651#   1671#   1672    1676#   1698#   1699    1703#   1706#
                    1724#   1725    1755#   1780#   1783#   1784    1790#   1811#   1830#   1858#   1883#   1884    1903#
                    1904    1907#   1934#   1935    1996#   1997    2014#   2042#   2066#   2078#   2098#   2099    2114#
                    2128#   2129    2144#   2158#   2168#   2172#   2173    2187#   2200#   2213#   2226#   2239#   2296#
```

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                    2348#   2358#   2368#   2379#   2390#   2398#   2399    2401#   2415#   2426#   2463#   2464    2484#
                    2497#   2508#   2563#   2573#   2587#   2598#   2631#   2632    2652#   2662#   2676#   2687#   2720#
                    2721    2728#   2729    2736#   2737    2744#   2745    2747#   2751#   2752    2774#   2788#   2802#
                    2872#   2904#   2910#   2916#   2922#   2929#   2948#   2965#   2971#   2977#   2983#   2989#   2995#
                    3001#   3007#   3014#   3049#
T$TEST= 000007       359#   1259#   1261    1281    1302    1323    1344    1363    1384    1405    1426    1451    1487#
                    1489    1509    1531    1552    1573    1593    1613    1634    1655    1680    1718#   1727    1759
                    1867#   1920#   2053#   2055    2119    2148    2163    2323#   2325    2406    2488    2567    2656
T$TSTM= 177777       359#    815     823     827     835     843     847     855     863     867     875     883     887
                     895     899     907     911     919     923     933     982     985    1038    1042    1164    1178
                    1185    1187    1194    1198    1213    1234    1237    1244    1261    1267    1272    1275    1278
                    1281    1288    1293    1296    1299    1302    1309    1314    1317    1320    1323    1330    1335
                    1338    1341    1344    1349    1354    1357    1360    1363    1370    1375    1378    1381    1384
                    1391    1396    1399    1402    1405    1412    1417    1420    1423    1426    1437    1442    1445
                    1448    1451    1464    1469    1472    1475    1479    1489    1495    1500    1503    1506    1509
                    1516    1521    1524    1527    1531    1538    1543    1546    1549    1552    1559    1564    1567
                    1570    1573    1580    1585    1588    1591    1593    1600    1605    1608    1611    1613    1620
                    1625    1628    1631    1634    1641    1646    1649    1652    1655    1666    1671    1674    1677
                    1680    1693    1698    1701    1704    1707    1724    1727    1733    1738    1741    1744    1748
                    1752    1756    1759    1763    1766    1769    1773    1777    1781    1783    1801    1808    1812
                    1820    1827    1831    1859    1871    1875    1877    1883    1889    1893    1897    1901    1903
                    1908    1922    1928    1932    1934    1956    1968    1982    1992    1996    2011    2015    2043
                    2055    2057    2063    2075    2094    2098    2101    2108    2112    2115    2119    2124    2128
                    2131    2138    2142    2145    2148    2152    2156    2159    2163    2169    2172    2184    2188
                    2197    2201    2210    2214    2223    2227    2235    2240    2297    2325    2327    2345    2355
                    2365    2376    2387    2398    2402    2406    2412    2423    2463    2466    2472    2478    2485
                    2488    2494    2505    2545    2551    2557    2564    2567    2570    2584    2595    2631    2634
                    2640    2646    2653    2656    2659    2673    2684    2720    2723    2728    2731    2736    2739
                    2744    2748    2751    2769    2775    2783    2789    2797    2803    2873
T$TSTS= 000001       359#   1259#   1487#   1718#   1867#   1920#   2053#   2323#
T$$CLE= 010013      1222#   1237    1243
T$$HAR= 010076      2900#   2929    2949
T$$HW = 010000       479#    490
T$$INI= 010012      1175#   1198    1212
T$$MSG= 010075       810#    826     830#    846     850#    866     870#    886     890#    898     902#    910     914#
                     922    1796#   1811    1815#   1830    2004#   2014    2178#   2187    2191#   2200    2204#   2213
                    2217#   2226    2230#   2239    2763#   2774    2778#   2788    2792#   2802
T$$RPT= 010011      1161#   1163
T$$SOF= 010077      2962#   3014    3050
T$$SRV= 010045      1787#   1790
T$$SUB= 010072      1261#   1277    1281#   1298    1302#   1319    1323#   1340    1344#   1359    1363#   1380    1384#
                    1401    1405#   1422    1426#   1447    1451#   1474    1489#   1505    1509#   1526    1531#   1548
                    1552#   1569    1573#   1590    1593#   1610    1613#   1630    1634#   1651    1655#   1676    1680#
                    1703    1727#   1755    1759#   1780    2055#   2114    2119#   2144    2148#   2158    2163#   2168
                    2325#   2401    2406#   2463    2484    2488#   2563    2567#   2652    2656#   2747
T$$SW = 010001       500#    517
T$$TES= 010065      1259#   1272    1293    1314    1335    1354    1375    1396    1417    1442    1469    1478    1487#
                    1500    1521    1543    1564    1585    1605    1625    1646    1671    1698    1706    1718#   1724
                    1783    1858    1867#   1883    1903    1907    1920#   1934    1996    2042    2053#   2098    2128
                    2172    2296    2323#   2398    2631    2720    2728    2736    2744    2751    2872
T1      005250 G     461   1259#
T1.1    005250      1261#
T1.10   005776      1451#
T1.2    005306      1281#
T1.3    005356      1302#
T1.4    005426      1323#
```

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T1.5     005474           1344#
T1.6     005532           1363#
T1.7     005602           1384#
T1.8     005650           1405#
T1.9     005716           1426#
T2       006070 G          462    1487#
T2.1     006070           1489#
T2.10    006626           1680#
T2.2     006126           1509#
T2.3     006176           1531#
T2.4     006246           1552#
T2.5     006314           1573#
T2.6     006362           1593#
T2.7     006432           1613#
T2.8     006500           1634#
T2.9     006546           1655#
T3       006720 G          463    1718#
T3.1     006732           1727#
T3.2     007040           1759#
T4       007452 G          464    1867#
T5       007612 G          465    1920#
T6       010366 G          466    2053#
T6.1     010366           2055#
T6.2     010604           2119#
T6.3     010700           2148#
T6.4     010722           2163#
T7       011516 G          467    2323#
T7.1     011516           2325#
T7.2     011756           2406#
T7.3     012304           2488#
T7.4     012624           2567#
T7.5     013162           2656#
ULIMIT   002200            626#   1025*  1027   1029   1031*  1034*  1035
UNIT     014374           2905    2931#
UNI.MA   022174           3056#*
USER.P   015260 G         3056#*
USER.T   015262 G         3056#*
VALID.   015522           3056#
VAL.LA   016252           3056#
VAL.SW   022310           3056#
VECT     002204            628#   1180*  1233   1731
VIPRI    004072            927#   2772   2786   2800
VIRMSG   003447            784#    930
VIRTAD   004346           1024#   2237   2446   2528   2618   2707   2771   2785   2799
WIDTH    031314           3056#
WORDCT   002212            631#    995*  2408*  2490*  2580*  2669*
XEQDIA   044466 G         3056#
XEQSUB   044454 G         3056#
XEQ.CL   024324           3056#
XEQ.CM   021632           3056#
XEQ.IN   024006           3056#
XEQ.LA   020170           3056#
XEQ.OP   024100           3056#
XEQ.PR   017422           3056#
XEQ.TE   024144           3056#
XTIME    043174 G         3056#
```

```
XTIMEN  044020            3056#
XTIMST  043216            3056#*
XXDP.D  022042            3056#
X$ALWA= 000000             359#   2929    3014
X$FALS= 000040             359#
X$OFFS= 000400             359#   2929    3014
X$TRUE= 000020             359#
X1X1  = 072000            3056#
ZERR    003036             731#    812
$BREG   022350            3056#*
$ENDAD  044440 G          3056#
$SAV2   045504 G          3056#
$SAV3   045520 G          3056#
$SAV4   045536 G          3056#
$SAV5   045556 G          3056#
      = 072000               2#    640#    641#    642#    656#   1199   1232   1273   1294   1315   1336   1355   1376
                          1397    1418    1443    1470    1501   1522   1544   1565   1586   1606   1626   1647   1672
                          1699    1725    1784    1856#   1884   1904   1935   1997   2040#  2099   2129   2173   2399
                          2464    2632    2721    2729    2737   2745   2752   2929   3014   3045#  3056#
```

```
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BCOMPL      1#    1878    1923
BERROR      1#
BGNAU       1#
BGNCLN      1#    1221
BGNDU       1#
BGNHRD      1#    2899
BGNHW       1#     478
BGNINI      1#    1174
BGNMOD      1#     368     456     531     614
BGNMSG      1#     809     829     849     869     889     901     913    1795    1814    2003    2177    2190    2203    2216
          2229    2762    2777    2791
BGNRPT      1#    1160
BGNSEG      1#
BGNSFT      1#    2961
BGNSRV      1#    1786
BGNSUB      1#    1260    1280    1301    1322    1343    1362    1383    1404    1425    1450    1488    1508    1530    1551
          1572    1592    1612    1633    1654    1679    1726    1758    2054    2118    2147    2162    2324    2405    2487
          2566    2655
BGNSW       1#     499
BGNTST      1#    1258    1486    1717    1866    1919    2052    2322
BNCOMP      1#    1188    2058    2328
BNERRO      1#
BREAK       1#
BRESET      1#
BUFFER      1#
CKLOOP      1#    1041    1274    1295    1316    1337    1356    1377    1398    1419    1444    1471    1502    1523    1545
          1566    1587    1607    1627    1648    1673    1700    1751    1776    1931    2100    2111    2130    2141    2155
CLKOFF      1#
CLKON       1#
CLREF       1#
CLRVEC      1#    1232
COMMEN      1#
DEVREG      1#     648
DEVTYP      1#     719
DISPAT      1#     458
DOCLN       1#
DODU        1#
DORPT       1#
ENDAU       1#
ENDCLN      1#    1242
ENDCOM      1#
ENDDU       1#
ENDHRD      1#    2947
ENDHW       1#     489
ENDINI      1#    1211
ENDMOD      1#     447     468     606     643
ENDMSG      1#     825     845     865     885     897     909     921    1810    1829    2013    2186    2199    2212    2225
          2238    2773    2787    2801
ENDRPT      1#    1162
ENDSEG      1#
ENDSFT      1#    3048
ENDSRV      1#    1789
ENDSUB      1#    1276    1297    1318    1339    1358    1379    1400    1421    1446    1473    1504    1525    1547    1568
          1589    1609    1629    1650    1675    1702    1754    1779    2113    2143    2157    2167    2400    2483    2562
          2651    2746
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ENDTST      1#  1477  1705  1857  1906  2041  2295  2871
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         2465   2471  2477  2544  2550  2556  2633  2639  2645  2722  2730  2738
ERRHRD      1#
ERRSF       1#
ERRSOF      1#
ESCAPE      1#
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FEQUAL      1#
GETPRI      1#
GETTIM      1#
GMANIA      1#
GMANID      1#   984  2074  2422  2504  2569  2594  2658  2683
GMANIL      1#  2062  2344  2354  2364  2375  2386  2411  2493  2583  2672
GPHARD      1#  1176
GPRMA       1#
GPRMD       1#   988  2078  2426  2508  2573  2598  2662  2687  2903  2909  2915  2921  2964  2970
         2976   2982  2988  2994  3000  3006
GPRML       1#  2066  2348  2358  2368  2379  2390  2415  2497  2587  2676
HEADER      1#   379
INLOOP      1#
IOSETU      1#
IOSTAR      1#
LASTAD      1#  3052
MANUAL      1#  1186  1876  1921  2056  2326
MSASCI      1#   380#  381   382   383   384   385   386
MSBRAN      1#
MSBYTE      1#   380#  387   388
MSCHEC      1#  1198#  1237#  1272#  1293#  1314#  1335#  1354#  1375#  1396#  1417#  1442#  1469#  1500#  1521#
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MSCKID      1#   415#
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          417   419   421   423   425   427   429   431   433   435   437   439   441   443   445
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         2563#  2652#  2747#  2774#  2788#  2802#  2872#  2948#  3049#
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MSENDE      1#   448#  469#  490#  517#  607#  644#  826#  846#  866#  886#  898#  910#  922#  1163#
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```

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               3001#   3002    3003    3004    3005    3007#   3008    3009    3010    3011    3014#   3049#   3053#
M$GNLS            1#    985#    993   2063#   2069    2075#   2083    2345#   2351    2355#   2361    2365#   .2371   2376#   2382
               2387#   2393    2412#   2418    2423#   2431    2494#   2500    2505#   2513    2570#   2578    2584#   2590    2595#
               2603    2659#   2667    2673#   2679    2684#   2692
M$GNLT            1#
M$GNSU            1#   1261#   1281#   1302#   1323#   1344#   1363#   1384#   1405#   1426#   1451#   1489#   1509#   1531#   1552#
               1573#   1593#   1613#   1634#   1655#   1680#   1727#   1759#   2055#   2119#   2148#   2163#   2325#   2406#   2488#
               2567#   2656#
```

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        2144#  2158#  2168#  2187#  2200#  2213#  2226#  2239#  2296#  2401#  2484#  2563#  2652#  2747#  2774#
        2788#  2802#  2872#  2948#  2949   3049#  3050
M$GNTE     1#  1259#  1487#  1718#  1867#  1920#  2053#  2323#
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M$HPTR     1#   380#   415
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M$INCR     1#   370#   458#   479#   500#   533#   616#   810#   830#   850#   870#   890#   902#   914#   985#
         994   1161#  1175#  1222#  1259#  1261#  1281#  1302#  1323#  1344#  1363#  1384#  1405#  1426#  1451#
        1487#  1489#  1509#  1531#  1552#  1573#  1593#  1613#  1634#  1655#  1680#  1718#  1727#  1759#  1787#
        1796#  1815#  1867#  1920#  2004#  2053#  2055#  2063#  2070   2075#  2084   2119#  2148#  2163#  2178#
        2191#  2204#  2217#  2230#  2323#  2325#  2345#  2352   2355#  2362   2365#  2372   2376#  2383   2387#
        2394   2406#  2412#  2419   2423#  2432   2488#  2494#  2501   2505#  2514   2567#  2570#  2579   2584#
        2591   2595#  2604   2656#  2659#  2668   2673#  2680   2684#  2693   2763#  2778#  2792#  2900#  2962#
M$IOSE     1#
M$LDPO     1#  1177#  1184#  1233#  1737#  1740#  1743#  1762#  1765#  1768#  1870#  1874#  1888#  1892#  1896#
        1900#
M$MASK     1#   649#   652
M$MCAL     1#
M$MSK1     1#   649#
M$POP      1#   448#   469#   490#   517#   607#   644#   826#   846#   866#   886#   898#   910#   922#  1163#
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        1548#  1569#  1590#  1610#  1630#  1651#  1676#  1703#  1706#  1755#  1780#  1790   1811#  1830#  1858#
        1907#  2014#  2042#  2114#  2144#  2158#  2168#  2187#  2200#  2213#  2226#  2239#  2296#  2401#  2484#
        2563#  2652#  2747#  2774#  2788#  2802#  2872#  2948#  3049#
M$PRIN     1#   812#   818#   832#   838#   852#   858#   872#   878#   892#   904#   916#   928#   979#  1191#
        1798#  1804#  1817#  1823#  1952#  1964#  1978#  1989#  2006#  2180#  2193#  2206#  2219#  2232#  2765#
        2780#  2794#
M$PUSH     1#   369#   370    457#   458    479#   500#   532#   533    615#   616    810#   830#   850#   870#
         890#   902#   914#  1161#  1175#  1222#  1259#  1261#  1281#  1302#  1323#  1344#  1363#  1384#  1405#
        1426#  1451#  1487#  1489#  1509#  1531#  1552#  1573#  1593#  1613#  1634#  1655#  1680#  1718#  1727#
        1759#  1787#  1796#  1815#  1867#  1920#  2004#  2053#  2055#  2119#  2148#  2163#  2178#  2191#  2204#
        2217#  2230#  2323#  2325#  2406#  2488#  2567#  2656#  2763#  2778#  2792#  2900#  2962#
M$PUT      1#   812#   818#   832#   838#   852#   858#   872#   878#   892#   904#   916#   928#   979#  1191#
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        2765#  2780#  2794#
M$PUT1     1#   812#   813    818#   819    820    821    832#   833    838#   839    840    841    852#   853
         858#   859    860    861    872#   873    878#   879    880    881    892#   893    904#   905    916#
         917    928#   929    930    931    979#   980   1191#  1192   1729#  1730   1731   1732   1798#  1799
        1804#  1805   1806   1817#  1818   1823#  1824   1825   1952#  1953   1954   1964#  1965   1966   1978#
        1979   1980   1989#  1990   2006#  2007   2008   2009   2180#  2181   2182   2193#  2194   2195   2206#
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M$RADI     1#   988#  2066#  2078#  2348#  2358#  2368#  2379#  2390#  2415#  2426#  2497#  2508#  2573#  2587#
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        3007#
M$RNRO     1#  1177#  1179
M$SETS     1#   370#   458#   479#   500#   533#   616#   810#   830#   850#   870#   890#   902#   914#  1161#
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M$SETT     1#
M$SPCL     1#
M$SPSE     1#
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          1323#   1335#    1338#   1340#   1341    1344#   1354#   1357#   1359#   1360    1363#   1375#   1378#   1380#   1381
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          1968    1978#    1982    1989#   1992    1996#   2006#   2011    2014#   2015    2042#   2043    2055#   2057#   2063#
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```

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POINTE             1#    376
PRINTB             1#    811     831     851     871     891     903     915    1797    1803    1816    1822    2005    2179    2192
                2205    2218    2231    2764    2779    2793
PRINTF             1#    927     978    1190    1951    1963    1977    1988
PRINTN             1#
PRINTS             1#
PRINTX             1#    817     837     857     877
READBU             1#
READEF             1#
REQTIM             1#
SETEF              1#
SETPRI             1#   1183    1736    1742    1761    1767
SETVEC             1#   1728
SLASH              1#
STARS              1#
SVC                1#    358#
TRAPPR             1#
UNBUFF             1#
WAITMS             1#   1869    1873    1887    1891    1895    1899
WAITUS             1#   1739    1764
XFER               1#   2929    3014
XFERF              1#
XFERT              1#


. ABS.   072000      000

 ERRORS DETECTED:   0

 DVMSAA.BIN,DVMSAA.SEQ/SOL/CRF/NL:TOC=SVC.SML,DVMSAA.P11,DOCTOR.P11
 RUN-TIME:  36 39 4 SECONDS
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RUN-TIME RATIO: 1193/81=14.6
CORE USED: 18K (35 PAGES)