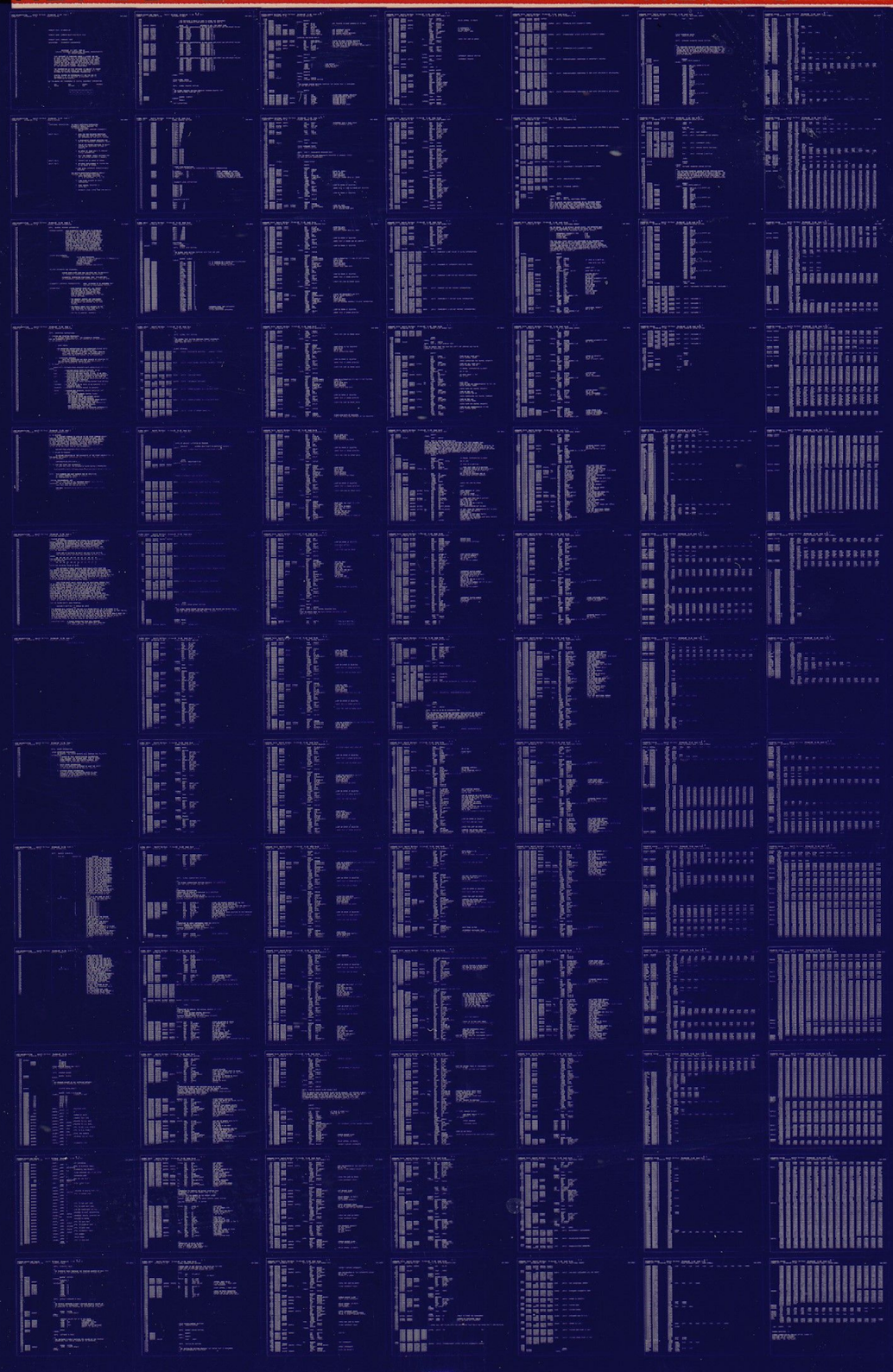
BDV11,
KDF11-B

BDV11/KDF11B BT DIAG
CVM8AF0

AH-B062F-MC
FICHE 1 OF 1



```
;
;
;
;
;
;
;
; PRODUCT CODE: AC-B061F-MC
;
; PRODUCT NAME: CVM8AF0 BDV11/KDF11B BT DIAG
;
; PRODUCT DATE: FEBRUARY 1983
;
; MAINTAINER:   DIAGNOSTIC ENGINEERING
;
;
;
;
;            COPYRIGHT (C) 1977, 1983 BY
;       DIGITAL EQUIPMENT CORPORATION, MAYNARD, MASSACHUSETTS
;                   ALL RIGHTS RESERVED
;
;       THIS SOFTWARE IS FURNISHED UNDER A LICENSE AND MAY
;       BE USED AND COPIED ONLY IN ACCORDANCE WITH THE TERMS
;       OF SUCH LICENSE AND WITH THE INCLUSION OF THE ABOVE
;       COPYRIGHT NOTICE.  THIS SOFTWARE OR ANY OTHER COPIES
;       THEREOF MAY NOT BE PROVIDED OR OTHERWISE MADE AVAIL-
;       ABLE TO ANY OTHER PERSON.  NO TITLE TO AND OWNERSHIP
;       OF THE SOFTWARE IS HEREBY TRANSFERRED.
;
;       THE INFORMATION IN THIS SOFTWARE IS SUBJECT TO CHANGE
;       WITHOUT NOTICE AND SHOULD NOT BE CONSTRUED AS A COM-
;       MITTMENT BY DIGITAL EQUIPMENT CORPORATION.
;
;       DIGITAL ASSUMES NO RESPONSIBILITY FOR THE USE OR
;       RELIABILITY OF ITS SOFTWARE ON EQUIPMENT THAT IS
;       NOT SUPPLIED BY DIGITAL.
;
;THE FOLLOWING ARE TRADEMARKS OF DIGITAL EQUIPMENT CORPORATION:
;
;       DEC             PDP             UNIBUS          MASSBUS
;       DECUS           DECTAPE         VAX
;
;                       ,---,---,---,---,---,---,---,
;                       | D | I | G | I | T | A | L |
;                       '---'---'---'---'---'---'---'
;
```

```
;++
; FUNCTIONAL DESCRIPTION:  THE BDV11 BOOTSTRAP/TERMINATOR/
;                          DIAGNOSTIC MODULE PROVIDES THE
;                          FOLLOWING FUNCTIONS:
;                               1. ROM RESIDENT HARDCORE DIAGNOSTIC
;                                  TESTS.
;
;*BDV11 ONLY*                   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.
;
;*BDV11 ONLY*                   7. SOCKETS FOR 2K WORDS OF EPROM.
;
;*BDV11 ONLY*                   8. OPTIONAL REPLACEMENT OF SYSTEM ROM
;                                  BY 8K WORDS OF EPROM.
;
;                               9.LINE CLOCK INTERRUPT ENABLE/DISABLE
;                                 REGISTER
;
;                         THE KDF11B BOOTSTRAP/DIAGNOSTIC MODULE
;                         PROVIDES THE FOLLOWING FUNCTIONS:
;                               1. ABOVE MENTIONED FUNCTIONS 1.,
;                                  3., 4.(8 SWITCHES), 5., 6., 9.
;
;                               2. LINE CLOCK CLEARED BY RESET
;                                  INSTRUCTION
;
;                               3. PAGE CONTROL REGISTER IS
;                                  WRITE ONLY
;
;                               4. PRIORITY LEVEL 6(THE SAME FOR KDF11A)
;
;--
```

```
                        .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 BUS PROCESSOR:
                        ;                                     11/03(LSI-11/02),11/23(KDF11-A),11/23B(KDF11-B)
                        ;                                     MICRO PDP-11(KDF11-B)
                        ;                                   16K WORDS OF MEMORY
                        ;                                   CONSOLE TERMINAL
                        ;                                   DIAGNOSTIC PROGRAM LOAD DEVICE
                        ;

                        ; RELATED DOCUMENTS AND STANDARDS:

                        ;                   CHQUSB XXDP+/SUPR USER MAN (AC-F348 -MC) TO REFERENCE
                        ;                   THE DIAGNOSTIC SUPERVISOR COMMAND INSTRUCTIONS.

                        ;                   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.
```

```
225
232                             .SBTTL  OPERATING INSTRUCTIONS
233
234                             ;1. LOADING AND STARTING PROCEDURES
235                             ;       IN SYSTEMS OTHER THAN APT,  THE DIAGNOSTIC PROGRAM
236                             ;AND THE DIAGNOSTIC SUPERVISOR WILL BE LOCATED ON THE XXDP+ MEDIA
237                             ;AS TWO SEPARATE FILES.
238                             ;
239                             ;
240                             ;       I. XXDP+ MEDIA
241                             ;
242                             ;         FOR OPERATING INSTRUCTIONS OF THE SUPERVISOR,PLEASE REFER
243                             ;         TO CHQUSB XXDP+/SUPR USER MAN (AC-F348 -MC).
244                             ;               ISSUE THE COMMAND ".R CVM8AF". THE XXDP+ MONITOR
245                             ;               WILL LOAD THE DIAGNOSTIC AND THE SUPERVISOR FILE
246                             ;               HSAA??.SYS AND GIVE CONTROL TO THE SUPERVISOR.
247                             ;
248                             ;       II. SUPERVISOR COMMANDS
249                             ;               ONCE THE SUPERVISOR HAS BEEN INVOKED AT LOCATION 200,
250                             ;          THE FOLLOWING COMMANDS SHOULD BE USED SELECTIVELY TO
251                             ;          CONTROL THE RUNNING OF THE DIAGNOSTIC:
252                             ;2. TO START
253                             ;
254                             ;     START/TEST:<TESTNOS>/PASS:<PASSCNT>/UNIT:<DEVN>/FLAG:<CF>:<CF>
255                             ;WHERE:
256                             ;     TEST        ::=(DEFINES WHICH TESTS TO EXECUTE, IF NO
257                             ;                     SPECIFICATION EXECUTE ALL TESTS)
258                             ;     PASS        ::=(INDICATES HOW MANY PASSES TO RUN, IF NO SPEC-
259                             ;                     IFICATION RUN UNTIL DIAGNOSTIC ESCAPE SEQUENCE)
260                             ;     UNIT        ::=(SPECIFIES WHICH UNIT ENTRIES TO GET FROM THE
261                             ;                     CONFIGURATION FILE, IF NO SPECIFICATION USE ALL
262                             ;                     APPLICABLE UNIT ENTRIES)
263                             ;     FLAG        ::=(SPECIFIES THE ERROR CONTROL/REPORT FLAG OPTIONS
264                             ;                     TO BE USED)
265                             ;     <TESTNOS>   ::=(LIST FOR UP TO 16 TESTS TO BE EXECUTED IN AN
266                             ;                     ASCENDING ORDER.
267                             ;     <PASSCNT>   ::=(NUMBER OF PROGRAM PASSES TO EXECUTE)
268                             ;
269                             ;     <DEVN>      ::=(UNIQUE,DEC STANDARD, DEVICE SPECIFIER AND
270                             ;                     UNIT NUMBER)
271                             ;     <CF>        ::=(ANY OF THE FOLLOWING CONTROL FLAGS:
272                             ;                       HOE-HALT ON ERROR
273                             ;                       LOE-LOOP ON ERROR AND ATTEMPT REPORT
274                             ;                       IER-INHIBIT ALL ERROR REPORTS
275                             ;                       IBE-INHIBIT BASIC AND EXTENDED ERROR REPORTS
276                             ;                       IXE-INHIBIT EXTENDED ERROR REPORTS
277                             ;                       PRI-DIRECT ALL ERROR, PASS, AND STATISTICAL
278                             ;                           REPORTS TO THE LINE PRINTER.
279                             ;                       BOE-AUDIO ERROR INDICATION
280                             ;                       UAM-UNATTENDED MODE, NO OPERATOR INTERVENTION
281                             ;                       PNT-PRINT NUMBER OF TEST BEING EXECUTED.)
282
```

```
;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>...
;
;
;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.
;       THIS TEST DOES NOT RUN ON KDF11-B.
;***
;       FOR MORE INFORMATION ON DRS FLAGS REFER TO XXDP+  USER'S
;       MANUAL
```

```
                        ; 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.
                        ;
                        ;       THERE ARE 12 SWITCHES ON BDV11 AND ONLY 8 ON KDF11-B.
                        ;       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 FOUR TABLES WITH FIRST ONE
                        ;ALL ZEROES FOR MANUAL CHANGES. THE SECOND ONE HAS THE CHECKWORDS FOR
                        ;THE 2KOF DIAGNOSTIC ROM WHICH IS RESIDENT ON THE BDV11A(#23-045E2 AND
                        ;#23-046E2). THE PROGRAM ALSO WILL COMPARE CHECKWORDS FOR ROMS #23-
                        ;010E2 AND #23-011E2 OR #23-339E2 AND #23-340E2 WHICH ARE IN THE NEXT TWO
                        ;TABLES. TO INPUT DIFFERENT CHECKWORDS, THE OPERATOR MUST RESPOND WITH
                        ;A YES TO THE SUPERVISOR'S QUESTION "CHANGE SW (Y/N)?". ZEROES WILL
                        ;THEN BE PRINTED AS THE QUESTIONS ARE ASKED.

                        ;       TEST 7(FOR BDV11 ONLY) 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).
                        ;
                        ;FOR THE MICRO PDP-11 WHEN PROMPTED:
                        ;
                        ;       TESTING A KDF11-B ? Y SHOULD BE INPUT
                        ;                           ---
                        ; THE PROGRAM WILL AUTOSIZE IF THE UUT IS A MICRO PDP-11. IF IT IS FOUND TO BE
                        ; A MICRO PDP-11 THE UUT WILL BE TESTED AS A KDF11-B.THE ONLY DIFFERENCE IS THAT THE MIC
                        ; HAS A 8K DIAGNOSTIC ROM INSTEAD OF A 2K DIAGNOSTIC ROM IN THE 11/23B.
                        ; THIS AUTOSIZING IS DEPENDENT ON THE FACT THAT ALL PAGES OF THE MICRO PDP-11 BOOT ROM S
                        ; HAVE A RTS PC (207) AT LOCATION 173774.THE CHECK OF THE ROM ID FOR THE MICRO PDP-11
                        ; IS ALSO DEPENDENT ON THE FACT THAT THE VERSION OF THE ROMS ARE STORED AS TEXT
                        ; IN LOCATION 173004 OF PAGE ID 17436 OF THE MICRO PDP-11 BOOT ROMS.
                        ;
                        ; 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
```

```
397                                     ;                   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
;       *BDV11 ONLY*                   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.
;                           3          TO VERIFY THAT PRIORITY 5 ALLOWS
;                                      INTERRUPTS IF PRIORITY OF A DEVICE
;                                      IS 6 (KDF11-A,KDF11-B)
;                           4          TO VERIFY THAT PRIORITY 6 DOESN'T
;                                      ALLOW INTERRUPS IF PRIORITY OF
;                                      A DEVICE IS 6 (KDF11-A,KDF11-B)
;                           5          TO VERIFY THAT RESET WORKS FOR
;                                      KDF11-B
```

```
                        ;
                        ;        4          1      LIGHT DISPLAY TEST
                        ;        5          1      ROCKER SWITCH TEST
                        ;        6          1      TO VERIFY THAT THE LOW BYTE
                        ;                          DIAGNOSTIC ROM HAS GOOD DATA.
                        ;                   2      TO VERIFY THAT THE HIGH BYTE
                        ;                          DIAGNOSTIC ROM HAS GOOD DATA.
                        ;                   3      TO INSURE THAT THE DIAGNOSTIC
                        ;                   4      ROMS HAVE NOT BEEN INTERCHANGED.
                        ;        7          1      TO DETERMINE IF THERE IS ANY
                        ;    *BDV11 ONLY*          ADDITIONAL MEMORY TO TEST.
                        ;                          THIS INFORMATION IS OBTAINED
                        ;                          THROUGH USER DIALOGUE.
                        ;                   2      TO TEST THE EXPANDED DIAGNOSTIC
                        ;                          ROM.FIRST THE REQUIRED CHECK-
                        ;                          WORDS MUST BE INPUT,AND THE
                        ;                          STARTING LOCATION IN MEMORY.
                        ;                          CHECKSUMS AND CHECKWORD
                        ;                          VERIFICATION CONFIRMS GOOD
                        ;                          DATA IN ROMS.
                        ;                   3      TO TEST THE EPROM IN THE
                        ;                          SOCKETS. TEST PROCEDURE IS AS
                        ;                          IN SUBTEST 2.
                        ;                   4      TO TEST SYSTEM ROM. SAME
                        ;                          TEST PROCEDURE AS IN SUBTEST 2.
                        ;                   5      TO TEST SYSTEM EPROM. SAME
                        ;                          TEST PROCEDURE AS IN SUBTEST 2.
```

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


                                        .SBTTL  PROGRAM HEADER

                                                BGNMOD  MDHEDR
                                        MDHEDR::

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

                                                POINTER BGNSW,BGNSFT


                                                HEADER  CVM8A,F,0,7,0,340
                                        LSNAME::                ;DIAGNOSTIC NAME
                                                .ASCII /C/
                                                .ASCII /V/
                                                .ASCII /M/
                                                .ASCII /8/
                                                .ASCII /A/
                                                .BYTE   0
                                                .BYTE   0
                                                .BYTE   0
                                        LSREV::                 ;REVISION LEVEL
                                                .ASCII  /F/
                                        LSDEPO::                ;0
                                                .ASCII  /0/
                                        LSUNIT::                ;NUMBER OF UNITS
                                                .WORD   0
                                        LSTIML::                ;LONGEST TEST TIME
                                                .WORD   7
                                        LSHPCP::                ;POINTER TO H.W. QUES.
                                                .WORD   LSHARD
                                        LSSPCP::                ;POINTER TO S.W. QUES.
                                                .WORD   LSSOFT
                                        LSHPTP::                ;PTR. TO DEF. H.W. PTABLE
                                                .WORD   LSHW
                                        LSSPTP::                ;PTR. TO S.W. PTABLE
                                                .WORD   LSSW
                                        LSLADP::                ;DIAG. END ADDRESS
                                                .WORD   LSLAST
                                        LSSTA::                 ;RESERVED FOR APT STATS
                                                .WORD   0
                                        LSCO::
                                                .WORD   0
                                        LSDTYP::                ;DIAGNOSTIC TYPE
                                                .WORD   0
```

```
    (5)  002036
    (4)  002036  000000
    (5)  002040
    (4)  002040  002124
    (5)  002042
    (4)  002042  000340
    (5)  002044
    (4)  002044  000000
    (5)  002046
    (4)  002046  000000
    (5)  002050
    (4)  002050     003
    (3)  002051     003
    (5)  002052
    (4)  002052  000000
    (5)  002054  000000
    (5)  002056
    (4)  002056  000000
    (5)  002060
    (4)  002060  003200
    (5)  002062
    (4)  002062  000000
    (5)  002064
    (4)  002064  000000
    (5)  002066
    (4)  002066  000000
    (5)  002070
    (4)  002070  000000
    (5)  002072
    (4)  002072  000000
    (5)  002074
    (4)  002074  000000
    (5)  002076
    (4)  002076  003126
    (5)  002100
    (4)  002100  104035
    (5)  002102
    (4)  002102  000000
    (5)  002104
    (4)  002104  005274
    (5)  002106
    (4)  002106  005400
    (5)  002110
    (4)  002110  005376
    (5)  002112
    (4)  002112  005370
    (5)  002114
    (4)  002114  000000
    (5)  002116
    (4)  002116  000000
    (5)  002120
    (4)  002120  000000
554  002122
555

L$APT::                 ;APT EXPANSION
        .WORD   0
L$DTP::                 ;PTR. TO DISPATCH TABLE
        .WORD   L$DISPATCH
L$PRIO::                ;DIAGNOSTIC RUN PRIORITY
        .WORD   340
L$ENVI::                ;FLAGS DESCRIBE HOW IT WAS SETUP
        .WORD   0
L$EXP1::                ;EXPANSION WORD
        .WORD   0
L$MREV::                ;SVC REV AND EDIT #
        .BYTE   C$REVISION
        .BYTE   C$EDIT
L$EF::                  ;DIAG. EVENT FLAGS
        .WORD   0
        .WORD   0
L$SPC::
        .WORD   0
L$DEVP::                ; POINTER TO DEVICE TYPE LIST
        .WORD   L$DVTYP
L$REPP::                ;PTR. TO REPORT CODE
        .WORD   0
L$EXP4::
        .WORD   0
L$EXP5::
        .WORD   0
L$AUT::                 ;PTR. TO ADD UNIT CODE
        .WORD   0
L$DUT::                 ;PTR. TO DROP UNIT CODE
        .WORD   0
L$LUN::                 ;LUN FOR EXERCISERS TO FILL
        .WORD   0
L$DESP::                ;POINTER TO DIAG. DESCRIPTION
        .WORD   L$DESC
L$LOAD::                ;GENERATE SPECIAL AUTOLOAD EMT
        EMT     E$LOAD
L$ETP::                 ;POINTER TO ERRTBL
        .WORD   0
L$ICP::                 ;PTR. TO INIT CODE
        .WORD   L$INIT
L$CCP::                 ;PTR. TO CLEAN-UP CODE
        .WORD   L$CLEAN
L$ACP::                 ;PTR. TO AUTO CODE
        .WORD   L$AUTO
L$PRT::                 ;PTR. TO PROTECT TABLE
        .WORD   L$PROT
L$TEST::                ;TEST NUMBER
        .WORD   0
L$DLY::                 ;DELAY COUNT
        .WORD   0
L$HIME::                ;PTR. TO HIGH MEM
        .WORD   0
        ENDMOD
```

```
                                .SBTTL  DISPATCH TABLE

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

002122                                  BGNMOD  DSPCODE
002122                          DSPCODE::
002122                                  DISPATCH 7
002122  000007                          .WORD   7
002124                          LSDISPATCH::
002124  005460                          .WORD   T1
002126  006324                          .WORD   T2
002130  007212                          .WORD   T3
002132  010606                          .WORD   T4
002134  010756                          .WORD   T5
002136  011610                          .WORD   T6
002140  014316                          .WORD   T7
002142                                  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.
                                ;--

002142                                  BGNHW   DFPTBL
002142  000005                          .WORD   L10000-L$HW/2
002144                          L$HW::
002144                          DFPTBL::

                                        ;DEFAULT VALUES FOR UP TO SIX UNITS
002144  000000                          .WORD   0               ;UNIT NUMBER 0
002146  000100                          .WORD   100             ;INTERRUPT VECTOR
002150  000007                          .WORD   7               ;PRIORITY LEVEL
002152  007777                          .WORD   7777            ;ROCKER SWITCH SETTINGS
002154  000000                          .WORD   0               ;BDV11 = 0, KDF11-B = 1

002156                                  ENDHW
002156                          L10000:

                                .SBTTL  SOFTWARE P-TABLE

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

002156                                  BGNSW   SFPTBL
002156  000040                          .WORD   L10001-L$SW/2
002160                          L$SW::
002160                          SFPTBL::
```

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

002160  000010                          .BLKW   10              ;RESERVE 8 LOC. FOR INPUT CHWS.
                                    ;THE CHECKWORDS CORRESPONDING TO ROM CHIPS #23-045E2 AND #23-046E2 FOLLOW:
002200  017042                          .WORD   17042           ;ROMA: PAGE 0,1
002202  020656                          .WORD   20656           ;ROMB: PAGE 2,3
002204  065162                          .WORD   65162           ;ROMC: PAGE 4,5
002206  161744                          .WORD   161744          ;ROMD: PAGE 6,7
002210  124453                          .WORD   124453          ;ROME: PAGE 10,11
002212  113667                          .WORD   113667          ;ROMF: PAGE 12,13
002214  056040                          .WORD   56040           ;ROMG: PAGE 14,15
002216  044734                          .WORD   44734           ;ROMH: PAGE 16,17

                                    ;THE CHECKWORDS CORRESPONDING TO ROM CHIPS #23-01CE2 AND #23-011E2 FOLLOW:
002220  031547                          .WORD   31547           ;ROMA: PAGE 0,1
002222  014036                          .WORD   14036           ;ROMB: PAGE 2,3
002224  065162                          .WORD   65162           ;ROMC: PAGE 4,5
002226  124632                          .WORD   124632          ;ROMD: PAGE 6,7
002230  032040                          .WORD   32040           ;ROME: PAGE 10,11
002232  167124                          .WORD   167124          ;ROMF: PAGE 12,13
002234  155461                          .WORD   155461          ;ROMG: PAGE 14,15
002236  032257                          .WORD   32257           ;ROMH: PAGE 16,17

                                    ;THE CHECKWORDS CORRESPONDING TO ROM CHIPS #23-339E2 AND #23-340E2 FOLLOW:
002240  166020                          .WORD   166020          ;ROMA: PAGE 0,1
002242  020232                          .WORD   020232          ;ROMB: PAGE 2,3
002244  045651                          .WORD   045651          ;ROMC: PAGE 4,5
002246  036474                          .WORD   036474          ;ROMD: PAGE 6,7
002250  066675                          .WORD   066675          ;ROME: PAGE 10,11
002252  163100                          .WORD   163100          ;ROMF: PAGE 12,13
002254  005407                          .WORD   005407          ;ROMG: PAGE 14,15
002256  022243                          .WORD   022243          ;ROMH: PAGE 16,17

002260                                  ENDSW
(3) 002260                          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.
                                    ;--

002260                                  BGNMOD  GLBEQAT
(3) 002260                          GLBEQAT::
002260                                  EQUALS
(1)                                 ;
(1)                                 ; BIT DIFINITIONS
(1)                                 ;
```

```
(1)          100000                  BIT15== 100000
(1)          040000                  BIT14== 40000
(1)          020000                  BIT13== 20000
(1)          010000                  BIT12== 10000
(1)          004000                  BIT11== 4000
(1)          002000                  BIT10== 2000
(1)          001000                  BIT09== 1000
(1)          000400                  BIT08== 400
(1)          000200                  BIT07== 200
(1)          000100                  BIT06== 100
(1)          000040                  BIT05== 40
(1)          000020                  BIT04== 20
(1)          000010                  BIT03== 10
(1)          000004                  BIT02== 4
(1)          000002                  BIT01== 2
(1)          000001                  BIT00== 1
(1)                                  ;
(1)          001000                  BIT9==  BIT09
(1)          000400                  BIT8==  BIT08
(1)          000200                  BIT7==  BIT07
(1)          000100                  BIT6==  BIT06
(1)          000040                  BIT5==  BIT05
(1)          000020                  BIT4==  BIT04
(1)          000010                  BIT3==  BIT03
(1)          000004                  BIT2==  BIT02
(1)          000002                  BIT1==  BIT01
(1)          000001                  BIT0==  BIT00
(1)                                  ;
(1)                                  ; EVENT FLAG DEFINITIONS
(1)                                  ;   EF32:EF17 RESERVED FOR SUPERVISOR TO PROGRAM COMMUNICATION
(1)                                  ;
(1)          000040                  EF.START==      32.                     ; START COMMAND WAS ISSUED
(1)          000037                  EF.RESTART==    31.                     ; RESTART COMMAND WAS ISSUED
(1)          000036                  EF.CONTINUE==   30.                     ; CONTINUE COMMAND WAS ISSUED
(1)          000035                  EF.NEW==        29.                     ; A NEW PASS HAS BEEN STARTED
(1)          000034                  EF.PWR==        28.                     ; A POWER-FAIL/POWER-UP OCCURRED
(1)                                  ;
(1)                                  ;
(1)                                  ; PRIORITY LEVEL DEFINITIONS
(1)                                  ;
(1)          000340                  PRI07== 340
(1)          000300                  PRI06== 300
(1)          000240                  PRI05== 240
(1)          000200                  PRI04== 200
(1)          000140                  PRI03== 140
(1)          000100                  PRI02== 100
(1)          000040                  PRI01== 40
(1)          000000                  PRI00== 0
(1)                                  ;
(1)                                  ;OPERATOR FLAG BITS
(1)                                  ;
(1)          000004                  EVL==     4
(1)          000010                  LOT==    10
(1)          000020                  ADR==    20
(1)          000040                  IDU==    40
(1)          000100                  ISR==   100
```

```
(1)            000200                  UAM==      200
(1)            000400                  BOE==      400
(1)            001000                  PNT==     1000
(1)            002000                  PRI==     2000
(1)            004000                  IXE==     4000
(1)            010000                  IBE==    10000
(1)            020000                  IER==    20000
(1)            040000                  LOE==    40000
(1)            100000                  HOE==   100000
674
682            177520                  PCR=177520
683            177524                  LSREG=177524
684  002260                                    ENDMOD
685                                    .SBTTL  GLOBAL DATA SECTION
686
687                                    ;++
688                                    ; THE GLOBAL DATA SECTION CONTAINS DATA THAT ARE USED
689                                    ; IN MORE THAN ONE TEST.
690                                    ;--
691
692  002260                                    BGNMOD  GLBDAT
(3)  002260                            GLBDAT::
693  002260  000000                           LCP:     .WORD   0              ;=1 IF RUNNING ON A MICRO PDP-11(AUTOSIZED)
694  002262  000000                           KDF11B:  .WORD   0              ;=1 IF RUNNING ON A KDF11-B
695  002264  000000                           VRTPCR:  .WORD   0              ;VIRTUAL PAGE CONTROL REGISTER
696  002266  000000                           BCF:     .WORD   0
697  002270  000000                           REAL:    .WORD   0
698  002272  000000                           LOPAG:   .WORD   0
699  002274  000000                           COUNTR:  .WORD   0
700  002276  000001                           ANSR:    .WORD   1
701  002300  000000                           RFLAG:   .WORD   0
702  002302  000000                           EXPSUM:  .WORD   0
703  002304  000000                           ACTSUM:  .WORD   0
704  002306  000000                           PASS:    .WORD   0
705  002310  000000                           PASCT:   .WORD   0
706  002312  000000                           ULIMIT:  .WORD   0
707  002314  000000                           PAGE:    .WORD   0
708  002316  000100                           VECT:    .WORD   100
709  002320  000000                           SWSET:   .WORD   0
710  002322  000000                           STORE:   .WORD   0
711  002324  000000                           WORDCT:  .WORD   0
712  002326  000000                           PRIOR:   .WORD   0
713  002330  000000                           CKWD:    .WORD   0
714  002332  000000                           BADWD:   .WORD   0
715  002334  000000                           RESPND:  .WORD   0
716  002336  000001                           RSET:    .WORD   1
717  002340  000000                           LORANG:  .WORD   0
718  002342  000000                           HIRANG:  .WORD   0
719  002344  000000                           BYTLOC:  .WORD   0
720  002346  000000                           ERRFLG:  .WORD   0
721  002350  000000                           DELCNT:  .WORD   0
722  002352  000010                           EXPDIA:  .BLKW   10             ;EXPANDED DIAG. ROM CHECKWORDS
723  002372  000010                           EPROM:   .BLKW   10             ;EPROM CHECKWORDS
724  002412  000100                           SYSROM:  .BLKW   100            ;SYSTEM ROM/EPROM CHECKWORDS
725  002612                                 ENDMOD
726
```

```
                                        .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

002612  042522  042101  053457  RWR:    .ASCIZ  "READ/WRITE REGISTER    ADDRESS: 177522"
002620  044522  042524  051040
002626  043505  051511  042524
002634  004522  042101  051104
002642  051505  035123  030440
002650  033467  031065  000062

002656  040520  042507  041440  PACR:   .ASCIZ  /PAGE CONTROL REGISTER  ADDRESS: 177520/
002664  047117  051124  046117
002672  051040  043505  051511
002700  042524  004522  042101
002706  051104  051505  035123
002714  030440  033467  031065
002722  000060

002724  044103  041505  051513  CKERR:  .ASCIZ  /CHECKSUM ERROR/
002732  046525  042440  051122
002740  051117     000

002743     111  041516  051117  CWDERR: .ASCIZ  /INCORRECT CHECKWORD/
002750  042522  052103  041440
002756  042510  045503  047527
002764  042122     000

002767     105  051122  051117  LOBYT:  .ASCIZ  /ERROR OCCURRED IN A LOW BYTE PAGE/
002774  047440  041503  051125
003002  042522  020104  047111
003010  040440  046040  053517
003016  041040  052131  020105
003024  040520  042507     000

003031     105  051122  051117  HIBYT:  .ASCIZ  /ERROR OCCURRED IN A HIGH BYTE PAGE/
003036  047440  041503  051125
003044  042522  020104  047111
003052  040440  044040  043511
003060  020110  054502  042524
003066  050040  043501  000105

003074  052123  051101  020124  LOADR:  .ASCIZ  /START OF MEMORY RANGE (K)/
003102  043117  046440  046505
003110  051117  020131  040522
003116  043516  020105  045450
003124  000051
```

```
753
754                                             .EVEN
755
756
757                                     ;
758                                     ; NAMES OF DEVICES SUPPORTED BY PROGRAM
759                                     ;
760  003126                                     DESCRIPT        <CVM8AE BDV11\KDF11-B BOOTSTRAP DIAGNOSTIC>
(4)  003126                             L$DESC::
(3)  003126  053103  034115  042501           .ASCIZ  /CVM8AE BDV11\KDF11-B BOOTSTRAP DIAGNOSTIC/
(3)  003134  041040  053104  030461
(3)  003142  045534  043104  030461
(3)  003150  041055  041040  047517
(3)  003156  051524  051124  050101
(3)  003164  042040  040511  047107
(3)  003172  051517  044524  000103
(2)
761  003200                                     .EVEN
(4)  003200                                     DEVTYP  <BDV11\KDF11-B>
(3)  003200  042102  030526  056061     L$DVTYP::
(3)  003206  042113  030506  026461           .ASCIZ  /BDV11\KDF11-B/
(3)  003214  000102
(2)
762                                             .EVEN
768
769                                     ;
770                                     ; FORMAT STATEMENTS USED IN PRINT CALLS
771                                     ;
772
773
774  003216  040445  042522  044507  ZERR:    .ASCIZ  /%AREGISTER CANNOT HOLD ALL ZEROES%N/
     003224  052123  051105  041440
     003232  047101  047516  020124
     003240  047510  042114  040440
     003246  046114  055040  051105
     003254  042517  022523  000116
775
776  003262  040445  042522  044507  ONERR:   .ASCIZ  /%AREGISTER CANNOT HOLD ALL ONES%N/
     003270  052123  051105  041440
     003276  047101  047516  020124
     003304  047510  042114  040440
     003312  046114  047440  042516
     003320  022523  000116
777
778  003324  040445  042522  044507  BDDAT:   .ASCIZ  /%AREGISTER CANNOT HOLD GOOD DATA%N/
     003332  052123  051105  041440
     003340  047101  047516  020124
     003346  047510  042114  043440
     003354  047517  020104  040504
     003362  040524  047045     000
779
780  003367     045  051101  043505  BYTINS: .ASCIZ  /%AREGISTER IS NOT BYTE ADDRESSABLE%N/
     003374  051511  042524  020122
     003402  051511  047040  052117
     003410  041040  052131  020105
     003416  042101  051104  051505
```

```
                003424  040523  046102  022505
                003432  000116
    781
    782 003434  040445  042522  044507  ROT1:   .ASCIZ  /%AREGISTER PICKED UP AN EXTRA SET BIT%N/
                003442  052123  051105  050040
                003450  041511  042513  020104
                003456  050125  040440  020116
                003464  054105  051124  020101
                003472  042523  020124  044502
                003500  022524  000116
    783
    784 003504  040445  042522  044507  ROT0:   .ASCIZ  /%AREGISTER PICKED UP AN EXTRA CLEAR BIT%N/
                003512  052123  051105  050040
                003520  041511  042513  020104
                003526  050125  040440  020116
                003534  054105  051124  020101
                003542  046103  040505  020122
                003550  044502  022524  000116
    785
    786 003556  040445  047125  041101  DIAGER: .ASCIZ  /%AUNABLE TO LOCATE CORRECT MEMORY PAGE%N/
                003564  042514  052040  020117
                003572  047514  040503  042524
                003600  041440  051117  042522
                003606  052103  046440  046505
                003614  051117  020131  040520
                003622  042507  047045     000
    787
    788 003627     045  046501  046505  VIRMSG: .ASCIZ  /%AMEMORY RANGE: %D2%A - %D2%AK%N/
                003634  051117  020131  040522
                003642  043516  035105  022440
                003650  031104  040445  026440
                003656  022440  031104  040445
                003664  022513  000116
    789
    790 003670  040445  054105  042520  REGDT:  .ASCIZ  /%AEXPECTED: %O6%S5%ARECEIVED: %O6%N/
                003676  052103  042105  020072
                003704  047445  022466  032523
                003712  040445  042522  042503
                003720  053111  042105  020072
                003726  047445  022466  000116
    791
    792                                         .EVEN
    799                                 .SBTTL  GLOBAL ERROR REPORT SECTION
    800
    801                                 ;++
    802                                 ; THE GLOBAL ERROR REPORT SECTION CONTAINS THE PRINTB AND PRINTX CALLS
    803                                 ; THAT ARE USED IN MORE THAN ONE TEST.  IT ALSO INCLUDES THE ASCII MESSAGES
    804                                 ; THAT ARE USED BY THE PRINTB AND PRINTX CALLS.
    805                                 ;--
    806
    807
    808
    809 003734                          BGNMSG  RERR1
    (3) 003734                          RERR1::
    810 003734                          PRINTB  #ZERR
    (7) 003734  012746  003216                  MOV     #ZERR,-(SP)
```

```
   (6)  003740  012746  000001                    MOV     #1,-(SP)
   (3)  003744  010600                            MOV     SP,R0
   (4)  003746  104414                            TRAP    C$PNTB
   (4)  003750  062706  000004                    ADD     #4,SP
   811  003754                              PRINTX  #REGDT,R1,R2
   (9)  003754  010246                            MOV     R2,-(SP)
   (8)  003756  010146                            MOV     R1,-(SP)
   (7)  003760  012746  003670                    MOV     #REGDT,-(SP)
   (6)  003764  012746  000003                    MOV     #3,-(SP)
   (3)  003770  010600                            MOV     SP,R0
   (4)  003772  104415                            TRAP    C$PNTX
   (4)  003774  062706  000010                    ADD     #10,SP
   812  004000                              ENDMSG
   (3)  004000                              L10002:
   (3)  004000  104423                            TRAP    C$MSG
   813
   814  004002                              BGNMSG  RERR2
   (3)  004002                              RERR2::
   815  004002                              PRINTB  #ONERR
   (7)  004002  012746  003262                    MOV     #ONERR,-(SP)
   (6)  004006  012746  000001                    MOV     #1,-(SP)
   (3)  004012  010600                            MOV     SP,R0
   (4)  004014  104414                            TRAP    C$PNTB
   (4)  004016  062706  000004                    ADD     #4,SP
   816  004022                              PRINTX  #REGDT,R1,R2
   (9)  004022  010246                            MOV     R2,-(SP)
   (8)  004024  010146                            MOV     R1,-(SP)
   (7)  004026  012746  003670                    MOV     #REGDT,-(SP)
   (6)  004032  012746  000003                    MOV     #3,-(SP)
   (3)  004036  010600                            MOV     SP,R0
   (4)  004040  104415                            TRAP    C$PNTX
   (4)  004042  062706  000010                    ADD     #10,SP
   817  004046                              ENDMSG
   (3)  004046                              L10003:
   (3)  004046  104423                            TRAP    C$MSG
   818
   819  004050                              BGNMSG  RERR3
   (3)  004050                              RERR3::
   820  004050                              PRINTB  #BDDAT
   (7)  004050  012746  003324                    MOV     #BDDAT,-(SP)
   (6)  004054  012746  000001                    MOV     #1,-(SP)
   (3)  004060  010600                            MOV     SP,R0
   (4)  004062  104414                            TRAP    C$PNTB
   (4)  004064  062706  000004                    ADD     #4,SP
   821  004070                              PRINTX  #REGDT,R1,R2
   (9)  004070  010246                            MOV     R2,-(SP)
   (8)  004072  010146                            MOV     R1,-(SP)
   (7)  004074  012746  003670                    MOV     #REGDT,-(SP)
   (6)  004100  012746  000003                    MOV     #3,-(SP)
   (3)  004104  010600                            MOV     SP,R0
   (4)  004106  104415                            TRAP    C$PNTX
   (4)  004110  062706  000010                    ADD     #10,SP
   822  004114                              ENDMSG
   (3)  004114                              L10004:
   (3)  004114  104423                            TRAP    C$MSG
   823
```

```
  824  004116                          BGNMSG  RERR4
  (3)  004116                          RERR4::
  825  004116                          PRINTB  #BYTINS
  (7)  004116  012746  003367                  MOV     #BYTINS,-(SP)
  (6)  004122  012746  000001                  MOV     #1.-(SP)
  (3)  004126  010600                          MOV     SP,R0
  (4)  004130  104414                          TRAP    C$PNTB
  (4)  004132  062706  000004                  ADD     #4,SP
  826  004136                          PRINTX  #REGDT,R1,R2
  (9)  004136  010246                          MOV     R2,-(SP)
  (8)  004140  010146                          MOV     R1,-(SP)
  (7)  004142  012746  003670                  MOV     #REGDT,-(SP)
  (6)  004146  012746  000003                  MOV     #3,-(SP)
  (3)  004152  010600                          MOV     SP,R0
  (4)  004154  104415                          TRAP    C$PNTX
  (4)  004156  062706  000010                  ADD     #10,SP
  827  004162                          ENDMSG
  (3)  004162                          L10005:
  (3)  004162  104423                          TRAP    C$MSG
  828
  829  004164                          BGNMSG  RERR5
  (3)  004164                          RERR5::
  830  004164                          PRINTB  #ROT1
  (7)  004164  012746  003434                  MOV     #ROT1,-(SP)
  (6)  004170  012746  000001                  MOV     #1,-(SP)
  (3)  004174  010600                          MOV     SP,R0
  (4)  004176  104414                          TRAP    C$PNTB
  (4)  004200  062706  000004                  ADD     #4,SP
  831  004204                          ENDMSG
  (3)  004204                          L10006:
  (3)  004204  104423                          TRAP    C$MSG
  832
  833  004206                          BGNMSG  RERR6
  (3)  004206                          RERR6::
  834  004206                          PRINTB  #ROT0
  (7)  004206  012746  003504                  MOV     #ROT0,-(SP)
  (6)  004212  012746  000001                  MOV     #1,-(SP)
  (3)  004216  010600                          MOV     SP,R0
  (4)  004220  104414                          TRAP    C$PNTB
  (4)  004222  062706  000004                  ADD     #4,SP
  835  004226                          ENDMSG
  (3)  004226                          L10007:
  (3)  004226  104423                          TRAP    C$MSG
  836
  837  004230                          BGNMSG  PAGERR
  (3)  004230                          PAGERR::
  838  004230                          PRINTB  #DIAGER
  (7)  004230  012746  003556                  MOV     #DIAGER,-(SP)
  (6)  004234  012746  000001                  MOV     #1,-(SP)
  (3)  004240  010600                          MOV     SP,R0
  (4)  004242  104414                          TRAP    C$PNTB
  (4)  004244  062706  000004                  ADD     #4,SP
  839  004250                          ENDMSG
  (3)  004250                          L10010:
  (3)  004250  104423                          TRAP    C$MSG
  840
```

```
841
842
843  004252                          VIPRI:  PRINTF  #VIRMSG,LORANG,HIRANG
(9)  004252  013746  002342                  MOV     HIRANG,-(SP)
(8)  004256  013746  002340                  MOV     LORANG,-(SP)
(7)  004262  012746  003627                  MOV     #VIRMSG,-(SP)
(6)  004266  012746  000003                  MOV     #3,-(SP)
(3)  004272  010600                          MOV     SP,R0
(4)  004274  104417                          TRAP    C$PNTF
(4)  004276  062706  000010                  ADD     #10,SP
844
845                                          .EVEN
846
852
853
854
855
856                                  .SBTTL  GLOBAL SUBROUTINES SECTION
857
858                                  ;++
859                                  ; THE GLOBAL SUBROUTINES SECTION CONTAINS THE SUBROUTINES
860                                  ; THAT ARE USED IN MORE THAN ONE TEST.
861                                  ;--
862
863                                  ;++
864                                  ;FUNCTIONAL DESCRIPTION:
865                                  ;SUBROUTINE TO COMPUTE A CHECKSUM IN A ROM/EPROM
866                                  ;INPUT: CONTENTS OF BCF
867                                  ;IMPLICIT INPUTS: CONTENTS OF PCR
868                                  ;OUTPUT: A CHECKSUM VALUE STORED IN LOCATION ACTSUM
869                                  ;CALLING SEQUENCE: JSR PC,CHKSUM
870                                  ;--
871
872  004302  012701  173776          CHKSUM: MOV     #173776,R1          ;STORE THE HIGHEST ADDRESS IN THE ROM
873  004306  063701  002266                  ADD     BCF,R1              ;FOR EITHER LOW OR HIGH BYTES
874  004312  005037  002304                  CLR     ACTSUM              ;CLEAR LOCATION WHICH WILL HOLD THE CHECKSUM
875  004316  012702  173000                  MOV     #173000,R2          ;COMPUTE THE LOWEST ADDRESS IN THE ROM
876  004322  063702  002266                  ADD     BCF,R2              ;WHERE THE DATA WILL START
877  004326  111204                  1$:     MOVB    (R2),R4             ;GET DATA IN BYTES
878  004330  060437  002304                  ADD     R4,ACTSUM           ;ADD CONTENTS OF EACH LOCATION TO THE CHECKSUM
879  004334  062702  000002                  ADD     #2,R2               ;ADJUST ADDRESS
880  004340  020201                          CMP     R2,R1               ;COMPARE CURRENT ADDRESS WITH HIGHEST ADDRESS
881  004342  002771                          BLT     1$                  ;BR IF LESS THAN
882  004344  000207                          RTS     PC                  ;RETURN
883
884                                  ;++
885                                  ;SUBROUTINE TO INPUT CHECKWORDS FROM THE OPERATOR
886                                  ;INPUTS: NUMBER OF CHECKWORDS TO INPUT
887                                  ;        POINTER TO STORAGE AREA
888                                  ;OUTPUTS: CHECKWORDS STORED IN PROPER TABLE
889                                  ;CALLING SEQUENCE: JSR  PC,INPUT
890                                  ;--
891
892  004346                          INPUT:  PRINTF  #INSTR              ;PRINT INSTRUCTIONS
(7)  004346  012746  004424                  MOV     #INSTR,-(SP)
(6)  004352  012746  000001                  MOV     #1,-(SP)
```

```
    (3)  004356  010600                        MOV     SP,R0
    (4)  004360  104417                        TRAP    C$PNTF
    (4)  004362  062706  000004                ADD     #4,SP
    893  004366                        INLP:   GMANID  INWORD,STORE,0,-1,0,177777,NO
    (3)  004366  104443                        TRAP    C$GMAN
    (3)  004370  000406                        BR      10000$
    (4)  004372  002322                        .WORD   STORE
    (5)  004374  000022                        .WORD   T$CODE
    (5)  004376  004512                        .WORD   INWORD
    (5)  004400  177777                        .WORD   -1
    (5)  004402  000000                        .WORD   T$LOLIM
    (5)  004404  177777                        .WORD   T$HILIM
    (3)  004406                        10000$:
    894  004406  013722  002322                MOV     STORE,(R2)+             ;PUT CHECKWORD IN TABLE
    895  004412  005337  002324                DEC     WORDCT                  ;DECREMENT WORD COUNT
    896  004416  001401                        BEQ     1$                      ;BR IF FINISHED
    897  004420  000762                        BR      INLP                    ;LOOP UNTIL TABLE IS COMPLETE
    898  004422  000207                1$:     RTS     PC                      ;RETURN
    899
    900  004424  040445  054524  042520  INSTR:  .ASCIZ  /%ATYPE IN THE CHECKWORDS AS LISTED IN THE PRINT SET%N/
         004432  044440  020116  044124
         004440  020105  044103  041505
         004446  053513  051117  051504
         004454  040440  020123  044514
         004462  052123  042105  044440
         004470  020116  044124  020105
         004476  051120  047111  020124
         004504  042523  022524  000116
    901
    902  004512  044103  041505  053513  INWORD: .ASCIZ  /CHECKWORD: /
         004520  051117  035104  000040
    903
    904                                        .EVEN
    905
    906                                ;++
    907                                ;SUBROUTINE TO COMPUTE THE VIRTUAL ADDRESS OF A BAD
    908                                ;PAGE IN MEMORY
    909                                ;INPUTS: PAGE IN PAGE CONTROL REGISTER
    910                                ;        BYTE CONTROL FLAG (BCF)
    911                                ;OUTPUTS: MEMORY RANGE IN WHICH ERROR OCCURRED
    912                                ;CALLING SEQUENCE: JSR  PC,VIRTAD
    913                                ;--
    914
    915  004526  005001                VIRTAD: CLR     R1                      ;START AT BOTTOM OF RANGE
    916  004530  012737  000007  002312        MOV     #7,ULIMIT               ;SET UPPER LIMIT OF PAGE
    917  004536  113737  177520  002314        MOVB    PCR,PAGE                ;LOW PAGE ERROR
    918  004544  023737  002314  002312  LPADD: CMP     PAGE,ULIMIT             ;IS PAGE <=ULIMIT
    919  004552  003430                        BLE     OUTPUT                  ;BR IF YES
    920  004554  022737  000057  002312        CMP     #57,ULIMIT              ;IS ULIMIT = 57
    921  004562  001006                        BNE     1$                      ;BR IF NO
    922  004564  012737  000207  002312        MOV     #207,ULIMIT             ;CHANGE UPPER LIMIT
    923  004572  012701  000020                MOV     #20,R1                  ;ADJUST MEMORY POINTER
    924  004576  000762                        BR      LPADD                   ;CHECK PAGE AGAIN
    925  004600  062737  000010  002312  1$:    ADD     #10,ULIMIT              ;INCREASE UPPER LIMIT
    926  004606  022737  000377  002312        CMP     #377,ULIMIT             ;HAS THE UPPER LIMIT EXCEEDED THE MAX. PAGE
    927  004614  002004                        BGE     2$                      ;BR IF NO
```

```
                        ERRDF   40,,PAGERR              ;COULD NOT FIND THE PAGE OF MEMORY
                        TRAP    C$ERDF
                        .WORD   40
                        .WORD   0
                        .WORD   PAGERR
                2$:     CKLOOP
                        TRAP    C$CLP1
                        INC     R1                      ;ADJUST POINTER
                        BR      LPADD                   ;LOOP UNTIL UPPER LIMIT IS FOUND
                OUTPUT: MOV     R1,LORANG               ;PULL THE LOW RANGE OUT OF THE TABLE
                        MOV     LORANG,HIRANG           ;COPY THE DATA
                        INC     HIRANG                  ;INCREMENT TO OBTAIN 1K RANGE
                        TST     RFLAG                   ;IS IT ROM (2K SEGMENTS)
                        BEQ     3$                      ;BR IF NO
                        INC     HIRANG                  ;OBTAIN 2K RANGE
                3$:     RTS     PC                      ;RETURN

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

                MEMTST: CLR     REAL                    ;CLEAR MEMORY INDICATOR
                LOBYTE: CLR     BCF                     ;SIGNAL LOW BYTES ARE BEING CHECKED
                        CMPB    #-1,@#173774            ;DOES THE ROM EXIST
                        BEQ     HIBYTE                  ;BR IF NO
                        INC     REAL                    ;INDICATE THAT MEMORY EXISTS
                        JSR     PC,CHKSUM               ;COMPUTE THE ACTUAL CHECKSUM
                        MOVB    @#173776,EXPSUM         ;GET THE STORED CHECKSUM
                        ADD     ACTSUM,EXPSUM           ;ADD THE EXPECTED AND ACTUAL CHECKSUMS
                        TSTB    EXPSUM                  ;TEST RESULTING CHECKBYTE
                        BEQ     1$                      ;BR IF NO ERROR
                        MOV     #1,ERRFLG               ;SET CHECHSUM ERROR FLAG
                        RTS     PC                      ;RETURN
                1$:

                HIBYTE: MOV     #1,BCF                  ;SET BCF TO DENOTE HIGH BYTES
                        CMPB    #-1,@#173775            ;DOES THE ROM EXIST
                        BEQ     TSTCKW                  ;BR IF NO
                        TST     REAL                    ;WAS THERE A LOW ROM?
                        BNE     2$                      ;BR IF YES
                        CLR     REAL                    ;DENOTE NON-EXISTENT LOW ROM
                        RTS     PC                      ;RETURN FOR ERROR MESSAGE
                2$:     INC     REAL                    ;INDICATE MEMORY EXISTS
                        JSR     PC,CHKSUM               ;COMPUTE CHECKSUM
                        MOVB    @#173777,EXPSUM         ;GET EXPECTED CHECKSUM
                        ADD     ACTSUM,EXPSUM           ;ADD THE EXPECTED AND ACTUAL CHECKSUMS
                        TSTB    EXPSUM                  ;TEST RESULTING CHECKBYTE
                        BEQ     TSTCKW                  ;BR IF EQUAL
                        MOV     #1,ERRFLG               ;SET CHECKSUM ERROR FLAG
                        RTS     PC                      ;RETURN
```

```
 979  005044  005737  002270          TSTCKW: TST     REAL            ;ANY MEMORY?
 980  005050  001434                          BEQ     5$              ;BR IF NO
 981  005052  022737  000001  002270          CMP     #1,REAL         ;SINGLE ROM?
 982  005060  001016                          BNE     3$              ;BR IF NO
 983  005062  123737  002330  173776          CMPB    CKWD,@#173776   ;COMPARE CHECKBYTE ONLY
 984  005070  001001                          BNE     100$            ;BR IF ERROR
 985  005072  000207                          RTS     PC              ;RETURN -- NO ERROR
 986  005074  005037  002332          100$:   CLR     BADWD           ;CLEAR LOCATION
 987  005100  012737  000002  002346          MOV     #2,ERRFLG       ;DENOTE CHECKSUM ERROR
 988  005106  113737  173776  002332          MOVB    @#173776,BADWD  ;STORE BAD BYTE
 989  005114  000207                          RTS     PC              ;RETURN
 990  005116  023737  002330  173776  3$:     CMP     CKWD,@#173776   ;COMPARE CHECKWORD
 991  005124  001406                          BEQ     5$              ;BR IF NO ERROR
 992  005126  012737  000002  002346  4$:     MOV     #2,ERRFLG       ;DENOTE CHECKSUM ERROR
 993  005134  013737  173776  002332          MOV     @#173776,BADWD  ;STORE WRONG CHECKWORD
 994  005142  000207                  5$:     RTS     PC              ;RETURN
 995
 996                                  ;++
 997                                  ;SUBROUTINE TO COMPUTE THE ACTUAL STARTING PAGE
 998                                  ;OF MEMORY IN WHICH THE MEMORY CHIP IS TO BE
 999                                  ;ADDRESSED.
1000                                  ;INPUTS: THE LOW NUMBER IN THE MEMORY RANGE
1001                                  ;        (I.E. X IN X-Y K)
1002                                  ;OUTPUT: PAGE NUMBER IN PCR WHICH DENOTES WHERE TESTING
1003                                  ;        SHOULD BEGIN.
1004                                  ;CALLING SEQUENCE: JSR  PC,SETADR
1005                                  ;--
1006
1007  005144  013701  002322          SETADR: MOV     STORE,R1        ;COPY DATA
1008  005150  020127  000005                  CMP     R1,#5           ;IS THE NUMBER <=5?
1009  005154  003006                          BGT     1$              ;BR IF NO
1010  005156  000241                          CLC                     ;CLEAR C-BIT FOR ROTATE
1011  005160  006101                          ROL     R1              ;ROTATE TO MULTIPLY
1012  005162  006101                          ROL     R1              ;  BY 10 (8)
1013  005164  006101                          ROL     R1              ;
1014  005166  110104                          MOVB    R1,R4           ;COPY DATA
1015  005170  000413                          BR      LOAD            ;LOAD THE PCR
1016  005172  012704  000020          1$:     MOV     #20,R4          ;START WITH 16 (10)
1017  005176  012705  000200                  MOV     #200,R5         ;CORRESPONDIGE PAGE IS 200
1018  005202  020104                  LOOP:   CMP     R1,R4           ;PAGE FOUND?
1019  005204  001404                          BEQ     2$              ;BR IF YES
1020  005206  005204                          INC     R4              ;NEXT PAGE
1021  005210  062705  000010                  ADD     #10,R5          ;NEXT PAGE
1022  005214  000772                          BR      LOOP            ;LOOP UNTIL PAGE IS FOUND
1023  005216  010504                  2$:     MOV     R5,R4           ;GET PAGE FOR PCR
1024  005220  110437  002272          LOAD:   MOVB    R4,LOPAG        ;LOW STARTING PAGE
1025  005224  005204                          INC     R4              ;INCREMENT
1026  005226  110437  002273                  MOVB    R4,LOPAG+1      ;HIGH STARTING PAGE
1027  005232  000207                          RTS     PC
1028
1029
1030                                  ;++
1031                                  ;SUBROUTINE TO DELAY IN MSECS
1032                                  ;DELAY IS USED IN TWO TESTS
1033                                  ;TEST 3 - BEVENT CLAMP ENABLE TEST
1034                                  ;TEST 4 - LIGHT DISPLAY TEST
```

```
                                        ;TIMING LOOP IS NOT CRITICAL FOR TESTS,SO THE SAME
                                        ;TIMER LOOP IS USED FOR LSI-11 AND 11/23.
                                        ;LOOP WILL BE 2.5 TIMES SLOWER FOR LSI-11
                                        ;
                                        ;CALL
                                        ;       JSR     R5,WDELAY
                                        ;       40.                             ;40 MSECS
                                        ;
005234  010146                  WDELAY: MOV     R1,-(SP)
005236  010246                          MOV     R2,-(SP)
005240  012502                          MOV     (R5)+,R2                ;APPROX. MSEC DELAY
005242  012737  000502  002350  1$:     MOV     #322.,DELCNT            ;11/23 APPROX. 1 MSEC LOOP
                                                                        ;10% TOLERANCE
005250  013701  002350          2$:     MOV     DELCNT,R1
005254  005301                  3$:     DEC     R1                      ;START APPROX. 1 MSEC LOOP
005256  001376                          BNE     3$
005260  005302                          DEC     R2                      ;CHECK ON MSECS REQUESTED
005262  001372                          BNE     2$                      ;BRANCH AND DO ANOTHER MSEC
005264  012602                          MOV     (SP)+,R2                ;SETUP FOR RETURN AFTER DELAY
005266  012601                          MOV     (SP)+,R1
005270  000205                          RTS     R5
```

```
                                .TITLE MISCELLANEOUS SECTIONS
                                .SBTTL  IDENTIFICATION


                                .SBTTL  REPORT CODING SECTION

005272                                  BGNRPT
 (3)  005272                    L$RPT::
005272                                  ENDRPT
 (3)  005272                    L10011:
 (3)  005272  104425                    TRAP    C$RPT


                                .SBTTL  INITIALIZE SECTION

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

```
 1148
 1149  005274                                 BGNINIT
  (3)  005274                           L$INIT::
 1150  005274
  (3)  005274  012700  000000                      GPHARD  #0,R1                ;GET POINTER TO BASE ADDRESS OF P-TABLE
  (3)  005300  104442                              MOV     #0,R0
  (3)  005302  010001                              TRAP    C$GPHRD
 1151  005304  016137  000002  002316              MOV     R0,R1
 1152  005312  016137  000004  002326              MOV     2(R1),VECT              ;GET INTERRUPT VECTOR
 1153  005320  016137  000006  002320              MOV     4(R1),PRIOR             ;GET PRIORITY LEVEL
 1154  005326  016137  000010  002262              MOV     6(R1),SWSET             ;GET ROCKER SWITCH SETTINGS
 1155                                               MOV     10(R1),KDF11B           ;GET KDF11-B INDICATOR
 1156                                         ;
 1157                                         ;AUTOSIZE FOR MICRO PDP-11
 1158  005334  012737  000400  177520        ;
 1159  005342  022737  000207  173774              MOV     #400,@#PCR              ;CLEAR THE PAGE CONTROL REGISTER
 1160  005350  001003                              CMP     #207,@#173774           ;ARE WE TESTING A MICRO PDP-11 ?
 1161  005352  012737  000001  002260              BNE     5$                      ;NO THEN SKIP THE NEXT INSTRUCTION
 1162  005360                                      MOV     #1,LCP                  ;YES THEN FLAG WE ARE TESTING A MICRO PDP-11
  (3)  005360  012700  000340                5$:  SETPRI  #PRI07                  ;INHIBIT INTERRUPTS
  (3)  005364  104441                              MOV     #PRI07,R0
 1183                                              TRAP    C$SPRI
 1184
 1185  005366                                 ENDINIT
  (3)  005366                           L10012:
  (3)  005366  104411                              TRAP    C$INIT
 1186
 1187  005370                                 BGNPROT
  (3)  005370                           L$PROT::
 1188  005370  177777                              .WORD   -1                      ;CSR OFFSET
 1189  005372  177777                              .WORD   -1                      ;MASS BUS OFFSET
 1190  005374  177777                              .WORD   -1                      ;DRIVE OFFSET
 1191  005376                                       ENDPROT
 1192
 1193  005376                                 BGNAUTO
  (3)  005376                           L$AUTO::
 1194  005376                                 ENDAUTO
  (3)  005376                           L10014:
  (3)  005376  104461                              TRAP    C$AUTO
 1195                                  .SBTTL  CLEANUP CODING SECTION
 1196
 1197                                  ;++
 1198                                  ; THE CLEANUP CODING SECTION CONTAINS THE CODING THAT IS PERFORMED
 1199                                  ; AT THE END OF EACH PASS.
 1200                                  ;--
 1201
 1202  005400                                 BGNCLN
  (3)  005400                           L$CLEAN::
 1203
 1204  005400  005037  177520                      CLR     PCR                     ;CLEAR PAGE CONTROL REGISTER
 1205  005404  005037  177522                      CLR     RWREG                   ;CLEAR READ/WRITE REGISTER
 1206  005410  012737  000001  002336              MOV     #1,RSET                 ;RESTORE DEFAULT VALUE
 1207  005416  005037  002334                      CLR     RESPND                  ;RESTORE DEFAULT
 1208  005422  005037  016412                      CLR     ADDON                   ;RESTORE DEFAULT
 1209  005426  012737  000001  002276              MOV     #1,ANSR                 ;RESTORE DEFAULT
 1210  005434  005237  002306                      INC     PASS                    ;INCREMENT PASS COUNT
```

```
 1211  005440  005237  002310                  INC     PASCT                   ;INCREMENT TEST 4 PASS COUNT
 1212  005444                                  CLRVEC  VECT                    ;CLEAR INTERRUPT VECTOR
  (3)  005444  013700  002316                  MOV     VECT,R0
  (3)  005450  104436                          TRAP    C$CVEC
 1219
 1220  005452                                  EXIT    CLN
  (3)  005452  104432                          TRAP    C$EXIT
  (3)  005454  000002                          .WORD   L10015-.
 1221
 1233
 1234
 1235  005456                                  ENDCLN
  (3)  005456                          L10015:
  (3)  005456  104412                          TRAP    C$CLEAN
 1236
 1237                                  .TITLE HARDWARE TESTS
 1238                                  .SBTTL  IDENTIFICATION
 1244
 1245
 1246                                  .SBTTL  TEST 1: READ/WRITE REGISTER TEST
 1247                                  ;++
 1248                                  ;TEST TO VERIFY THAT THE READ/WRITE REGISTER AT ADDRESS 177522
 1249                                  ;IS WORD AND BYTE ADDRESSABLE.
 1250                                  ;--
 1251
 1252          177522                  RWREG=177522
 1253
 1254  005460                          BGNTST
 1255
 1256  005460                          BGNSUB
  (3)  005460  104402                  TRAP    C$BSUB
 1257  005462  005037  177522          CLR     RWREG                   ;LOAD ALL ZEROS
 1258  005466  001412                  BEQ     1$                      ;BR IF CLEAR
 1259  005470  005001                  CLR     R1                      ;EXPECTED DATA
 1260  005472  013702  177522          MOV     RWREG,R2                ;COPY CONTENTS
 1261  005476                          ERRDF   1,RWR,RERR1             ;REGISTER CANNOT HOLD ALL ZEROS
  (4)  005476  104455                  TRAP    C$ERDF
  (5)  005500  000001                  .WORD   1
  (5)  005502  002612                  .WORD   RWR
  (5)  005504  003734                  .WORD   RERR1
 1262  005506                          CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  005506  104406                  TRAP    C$CLP1
 1263  005510                          EXIT    TST                     ;ABORT TEST IF LOOP ON ERROR NOT SELECTED
  (3)  005510  104432                  TRAP    C$EXIT
  (3)  005512  000610                  .WORD   L10016-.
 1264  005514                  1$:     CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  005514  104406                  TRAP    C$CLP1
 1265  005516                          ENDSUB
  (3)  005516                  L10017:
  (3)  005516  104403                  TRAP    C$ESUB
 1266
 1267  005520                          BGNSUB
  (3)  005520  104402                  TRAP    C$BSUB
 1268  005522  012737  177777  177522  MOV     #-1,RWREG               ;LOAD ALL ONES
 1269  005530  022737  177777  177522  CMP     #177777,RWREG           ;CHECK THE REGISTER
 1270  005536  001413                  BEQ     2$                      ;BR IF HOLDING GOOD DATA
```

```
 1271  005540  012701  177777                MOV     #-1,R1                  ;EXPECTED DATA
 1272  005544  013702  177522                MOV     RWREG,R2                ;COPY CONTENTS
 1273  005550                                ERRDF   2,RWR,RERR2             ;REGISTER CANNOT HOLD ALL ONES
  (4)  005550  104455                        TRAP    C$ERDF
  (5)  005552  000002                        .WORD   2
  (5)  005554  002612                        .WORD   RWR
  (5)  005556  004002                        .WORD   RERR2
 1274  005560                                CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  005560  104406                        TRAP    C$CLP1
 1275  005562                                EXIT    TST                     ;ABORT TEST IF ERROR AND NO LOOPING
  (3)  005562  104432                        TRAP    C$EXIT
  (3)  005564  000536                        .WORD   L10016-.
 1276  005566                        2$:     CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  005566  104406                        TRAP    C$CLP1
 1277  005570                                ENDSUB
  (3)  005570                        L10020:
  (3)  005570  104403                        TRAP    C$ESUB
 1278
 1279  005572                                BGNSUB
  (3)  005572  104402                        TRAP    C$BSUB
 1280  005574  012737  125252  177522        MOV     #125252,RWREG           ;LOAD ALTERNATING 1'S AND 0'S BIT PATTERN
 1281  005602  022737  125252  177522        CMP     #125252,RWREG           ;CHECK DATA
 1282  005610  001413                        BEQ     3$                      ;BR IF GOOD
 1283  005612  012701  125252                MOV     #125252,R1              ;EXPECTED DATA
 1284  005616  013702  177522                MOV     RWREG,R2                ;COPY CONTENTS
 1285  005622                                ERRDF   3,RWR,RERR3             ;CANNOT HOLD GOOD DATA
  (4)  005622  104455                        TRAP    C$ERDF
  (5)  005624  000003                        .WORD   3
  (5)  005626  002612                        .WORD   RWR
  (5)  005630  004050                        .WORD   RERR3
 1286  005632                                CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  005632  104406                        TRAP    C$CLP1
 1287  005634                                EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
  (3)  005634  104432                        TRAP    C$EXIT
  (3)  005636  000464                        .WORD   L10016-.
 1288  005640                        3$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
  (3)  005640  104406                        TRAP    C$CLP1
 1289  005642                                ENDSUB
  (3)  005642                        L10021:
  (3)  005642  104403                        TRAP    C$ESUB
 1290
 1291  005644                                BGNSUB
  (3)  005644  104402                        TRAP    C$BSUB
 1292  005646  105037  177522                CLRB    RWREG                   ;CLEAR THE REGISTER'S LOW BYTE
 1293  005652  022737  125000  177522        CMP     #125000,RWREG           ;DID IT CLEAR PROPERLY?
 1294  005660  001413                        BEQ     4$                      ;BR IF YES
 1295  005662  012701  125000                MOV     #125000,R1              ;EXPECTED DATA
 1296  005666  013702  177522                MOV     RWREG,R2                ;COPY CONTENTS
 1297  005672                                ERRDF   4,RWR,RERR4             ;DID NOT RESPOND PROPERLY TO BYTE INSTRUCTION
  (4)  005672  104455                        TRAP    C$ERDF
  (5)  005674  000004                        .WORD   4
  (5)  005676  002612                        .WORD   RWR
  (5)  005700  004116                        .WORD   RERR4
 1298  005702                                CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  005702  104406                        TRAP    C$CLP1
 1299  005704                                EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
```

```
                        TRAP    C$EXIT
  (3)  005704  104432
  (3)  005706  000414           .WORD   L10016-.
1300   005710                   4$:     CKLOOP                  ;CHECK FOR LOOP ON ERROR AGAIN
  (3)  005710  104406           TRAP    C$CLP1
1301   005712                   ENDSUB
  (3)  005712                   L10022:
  (3)  005712  104403           TRAP    C$ESUB
1302
1303   005714                   BGNSUB
  (3)  005714  104402           TRAP    C$BSUB
1304   005716  000337  177522   SWAB    RWREG                   ;SWAP BYTES IN THE REGISTER
1305   005722  022737  000252  177522   CMP     #252,RWREG      ;GOOD DATA?
1306   005730  001407           BEQ     5$                      ;BR IF YES
1307   005732                   ERRDF   5,RWR,RERR4             ;BYTE INSTRUCTION ERROR
  (4)  005732  104455           TRAP    C$ERDF
  (5)  005734  000005           .WORD   5
  (5)  005736  002612           .WORD   RWR
  (5)  005740  004116           .WORD   RERR4
1308   005742                   CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  005742  104406           TRAP    C$CLP1
1309   005744                   EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
  (3)  005744  104432           TRAP    C$EXIT
  (3)  005746  000354           .WORD   L10016-.
1310   005750                   5$:     CKLOOP                  ;CHECK FOR LOOP ON ERROR AGAIN
  (3)  005750  104406           TRAP    C$CLP1
1311   005752                   ENDSUB
  (3)  005752                   L10023:
  (3)  005752  104403           TRAP    C$ESUB
1312
1313   005754                   BGNSUB
  (3)  005754  104402           TRAP    C$BSUB
1314   005756  012737  052525  177522   MOV     #052525,RWREG   ;LOAD AN ALTERNATING 0'S AND 1'S BIT PATTERN
1315   005764  022737  052525  177522   CMP     #052525,RWREG   ;CHECK IT
1316   005772  001413           BEQ     6$                      ;BR IF GOOD DATA
1317   005774  012701  052525   MOV     #052525,R1              ;EXPECTED DATA
1318   006000  013702  177522   MOV     RWREG,R2                ;COPY CONTENTS
1319   006004                   ERRDF   6,RWR,RERR3             ;CANNOT HOLD GOOD DATA
  (4)  006004  104455           TRAP    C$ERDF
  (5)  006006  000006           .WORD   6
  (5)  006010  002612           .WORD   RWR
  (5)  006012  004050           .WORD   RERR3
1320   006014                   CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  006014  104406           TRAP    C$CLP1
1321   006016                   EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
  (3)  006016  104432           TRAP    C$EXIT
  (3)  006020  000302           .WORD   L10016-.
1322   006022                   6$:     CKLOOP                  ;CHECK FOR LOOP ON ERROR AGAIN
  (3)  006022  104406           TRAP    C$CLP1
1323   006024                   ENDSUB
  (3)  006024                   L10024:
  (3)  006024  104403           TRAP    C$ESUB
1324
1325   006026                   BGNSUB
  (3)  006026  104402           TRAP    C$BSUB
1326   006030  105037  177523   CLRB    RWREG+1                 ;CLEAR HIGH BYTE OF REGISTER
1327   006034  022737  000125  177522   CMP     #125,RWREG      ;CHECK THE RESULTING CONTENTS OF THE REGISTER
```

```
1328  006042  001413                        BEQ     7$                      ;BR IF GOOD DATA
1329  006044  012701  000125                MOV     #125,R1                 ;EXPECTED DATA
1330  006050  013702  177522                MOV     RWREG,R2                ;COPY CONTENTS
1331  006054                                ERRDF   7,RWR,RERR4             ;BYTE INSTRUCTION ERROR
 (4)  006054  104455                        TRAP    C$ERDF
 (5)  006056  000007                        .WORD   7
 (5)  006060  002612                        .WORD   RWR
 (5)  006062  004116                        .WORD   RERR4
1332  006064                                CKLOOP                          ;LOOP ON ERROR IF SELECTED
 (3)  006064  104406                        TRAP    C$CLP1
1333  006066                                EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
 (3)  006066  104432                        TRAP    C$EXIT
 (3)  006070  000232                        .WORD   L10016-.
1334  006072                        7$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
 (3)  006072  104406                        TRAP    C$CLP1
1335  006074                                ENDSUB
 (3)  006074                        L10025:
 (3)  006074  104403                        TRAP    C$ESUB
1336
1337  006076                                BGNSUB
 (3)  006076  104402                        TRAP    C$BSUB
1338  006100  000337  177522                SWAB    RWREG                   ;SWAP BYTES
1339  006104  022737  052400  177522        CMP     #052400,RWREG           ;DATA GOOD?
1340  006112  001413                        BEQ     10$                     ;BR IF YES
1341  006114  012701  052400                MOV     #52400,R1               ;EXPECTED DATA
1342  006120  013702  177522                MOV     RWREG,R2                ;COPY CONTENTS
1343  006124                                ERRDF   10,RWR,RERR4            ;BYTE INSTRUCTION ERROR
 (4)  006124  104455                        TRAP    C$ERDF
 (5)  006126  000012                        .WORD   10
 (5)  006130  002612                        .WORD   RWR
 (5)  006132  004116                        .WORD   RERR4
1344  006134                                CKLOOP                          ;LOOP ON ERROR IF SELECTED
 (3)  006134  104406                        TRAP    C$CLP1
1345  006136                                EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
 (3)  006136  104432                        TRAP    C$EXIT
 (3)  006140  000162                        .WORD   L10016-.
1346  006142                        10$:    CKLOOP                          ;CHECK FOR LOOP ON ERROR AGAIN
 (3)  006142  104406                        TRAP    C$CLP1
1347  006144                                ENDSUB
 (3)  006144                        L10026:
 (3)  006144  104403                        TRAP    C$ESUB
1348
1349  006146                                BGNSUB
 (3)  006146  104402                        TRAP    C$BSUB
1350  006150  005037  177522                CLR     RWREG                   ;MAKE SURE THE C-BIT IS CLEAR
1351  006154  052737  100000  177522        BIS     #BIT15,RWREG            ;SET MSB
1352  006162  013703  177522                MOV     RWREG,R3                ;COPY DATA IN RWREG
1353  006166  023703  177522        ROTLP1: CMP     RWREG,R3                ;ARE THEY THE SAME?
1354  006172  001005                        BNE     11$                     ;BR IF NO
1355  006174  006003                        ROR     R3                      ;ROTATE THE SET BIT
1356  006176  001412                        BEQ     12$                     ;BR WHEN FINISHED
1357  006200  006037  177522                ROR     RWREG                   ;REPEAT ROTATE
1358  006204  000770                        BR      ROTLP1                  ;LOOP UNTIL ROTATE IS COMPLETE
1359  006206                        11$:    ERRDF   11,RWR,RERR5
 (4)  006206  104455                        TRAP    C$ERDF
 (5)  006210  000013                        .WORD   11
```

```
  (5)  006212  002612                        .WORD   RWR
  (5)  006214  004164                        .WORD   RERR5
1360   006216                                CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  006216  104406                        TRAP    C$CLP1
1361   006220                                EXIT    TST                     ;SKIP REST OF TEST
  (3)  006220  104432                        TRAP    C$EXIT
  (3)  006222  000100                        .WORD   L10016-.
1362   006224                        12$:    CKLOOP                          ;CHECK FOR LOOP ON ERROR
  (3)  006224  104406                        TRAP    C$CLP1
1363   006226                                ENDSUB
  (3)  006226                        L10027:
  (3)  006226  104403                        TRAP    C$ESUB
1364
1365   006230                                BGNSUB
  (3)  006230  104402                        TRAP    C$BSUB
1366   006232  012737  177777  177522        MOV     #-1,RWREG               ;SET ALL ONES
1367   006240  042737  100000  177522        BIC     #BIT15,RWREG            ;CLEAR MSB
1368   006246  013703  177522                MOV     RWREG,R3                ;COPY DATA
1369   006252  023703  177522        ROTLP2: CMP     RWREG,R3                ;ARE THEY THE SAME?
1370   006256  001010                        BNE     13$                     ;BR IF NO
1371   006260  000261                        SEC                             ;SET C-BIT FOR ROTATE
1372   006262  006037  177522                ROR     RWREG                   ;ROTATE CLEAR BIT
1373   006266  006003                        ROR     R3                      ;REPEAT
1374   006270  022703  077777                CMP     #077777,R3              ;FINISHED?
1375   006274  001366                        BNE     ROTLP2                  ;BR IF NOT YET
1376   006276  000407                        BR      14$                     ;SUBTEST FINISHED
1377   006300                        13$:    ERRDF   12,RWR,RERR6
  (4)  006300  104455                        TRAP    C$ERDF
  (5)  006302  000014                        .WORD   12
  (5)  006304  002612                        .WORD   RWR
  (5)  006306  004206                        .WORD   RERR6
1378   006310                                CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  006310  104406                        TRAP    C$CLP1
1379   006312                                EXIT TST
  (3)  006312  104432                        TRAP    C$EXIT
  (3)  006314  000006                        .WORD   L10016-.
1380   006316                        14$:    CKLOOP
  (3)  006316  104406                        TRAP    C$CLP1
1381   006320                                ENDSUB
  (3)  006320                        L10030:
  (3)  006320  104403                        TRAP    C$ESUB
1382
1383   006322                                ENDTST
  (3)  006322                        L10016:
  (3)  006322  104401                        TRAP    C$ETST
1384                                .SBTTL  TEST 2: PAGE CONTROL REGISTER TEST
1385                                ;++
1386                                ;TEST TO VERIFY THAT THE PAGE CONTROL REGISTER IS WORD
1387                                ;AND BYTE ADDRESSABLE.
1388                                ;--
1389
1390   006324                                BGNTST
1391
1392   006324  005737  002262                TST     KDF11B                  ;IF THIS IS A KDF11-B...
1393   006330  001402                        BEQ     15$
1394   006332                                EXIT    TST                     ;...THEN SKIP THIS TEST
```

```
                                                                M 3
  (3)  006332  104432                   TRAP    C$EXIT
  (3)  006334  000654                   .WORD   L10031-.
1395
1396  006336                            15$:    BGNSUB
  (3)  006336  104402                   TRAP    C$BSUB
1397  006340  005037  177520            CLR     PCR                     ;LOAD ALL ZEROS
1398  006344  001412                    BEQ     1$                      ;BR IF CLEARED
1399  006346  005001                    CLR     R1                      ;EXPECTED DATA
1400  006350  013702  177520            MOV     PCR,R2                  ;COPY CONTENTS
1401  006354                            ERRDF   13,PACR,RERR1           ;REGISTER CANNOT HOLD ALL ZEROS
  (4)  006354  104455                   TRAP    C$ERDF
  (5)  006356  000015                   .WORD   13
  (5)  006360  002656                   .WORD   PACR
  (5)  006362  003734                   .WORD   RERR1
1402  006364                            CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  006364  104406                   TRAP    C$CLP1
1403  006366                            EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
  (3)  006366  104432                   TRAP    C$EXIT
  (3)  006370  000620                   .WORD   L10031-.
1404  006372                            1$:     CKLOOP                  ;CHECK FOR LOOP ON ERROR AGAIN
  (3)  006372  104406                   TRAP    C$CLP1
1405  006374                            ENDSUB
  (3)  006374                           L10032:
  (3)  006374  104403                   TRAP    C$ESUB
1406
1407  006376                            BGNSUB
  (3)  006376  104402                   TRAP    C$BSUB
1408  006400  012737  177777  177520    MOV     #-1,PCR                 ;LUAD ALL ONES
1409  006406  022737  177777  177520    CMP     #177777,PCR             ;CHECK FOR GOOD DATA
1410  006414  001413                    BEQ     2$                      ;BR IF GOOD
1411  006416  012701  177777            MOV     #-1,R1                  ;EXPECTED DATA
1412  006422  013702  177520            MOV     PCR,R2                  ;COPY CONTENTS
1413  006426                            ERRDF   14,PACR,RERR2           ;REGISTER CANNOT HOLD ALL ONES
  (4)  006426  104455                   TRAP    C$ERDF
  (5)  006430  000016                   .WORD   14
  (5)  006432  002656                   .WORD   PACR
  (5)  006434  004002                   .WORD   RERR2
1414  006436                            CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  006436  104406                   TRAP    C$CLP1
1415  006440                            EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
  (3)  006440  104432                   TRAP    C$EXIT
  (3)  006442  000546                   .WORD   L10031-.
1416  006444                            2$:     CKLOOP                  ;CHECK FOR LOOP ON ERROR AGAIN
  (3)  006444  104406                   TRAP    C$CLP1
1417  006446                            ENDSUB
  (3)  006446                           L10033:
  (3)  006446  104403                   TRAP    C$ESUB
1418
1419
1420  006450                            BGNSUB
  (3)  006450  104402                   TRAP    C$BSUB
1421  006452  012737  125252  177520    MOV     #125252,PCR             ;LOAD AN ALTERNATING 1'S AND 0'S BIT PATTERN
1422  006460  022737  125252  177520    CMP     #125252,PCR             ;CHECK THE RESULTS
1423  006466  001413                    BEQ     3$                      ;BR IF GOOD DATA
1424  006470  012701  125252            MOV     #125252,R1              ;EXPECTED DATA
1425  006474  013702  177520            MOV     PCR,R2                  ;COPY CONTENTS
```

```
1426  006500
 (4)  006500  104455
 (5)  006502  000017
 (5)  006504  002656
 (5)  006506  004050
1427  006510
 (3)  006510  104406
1428  006512
 (3)  006512  104432
 (3)  006514  000474
1429  006516
 (3)  006516  104406
1430  006520
 (3)  006520
 (3)  006520  104403
1431
1432  006522
 (3)  006522  104402
1433  006524  105037  177520
1434  006530  022737  125000  177520
1435  006536  001413
1436  006540  012701  125000
1437  006544  013702  177520
1438  006550
 (4)  006550  104455
 (5)  006552  000020
 (5)  006554  002656
 (5)  006556  004116
1439  006560
 (3)  006560  104406
1440  006562
 (3)  006562  104432
 (3)  006564  000424
1441  006566
 (3)  006566  104406
1442  006570
 (3)  006570
 (3)  006570  104403
1443
1444  006572
 (3)  006572  104402
1445  006574  000337  177520
1446  006600  022737  000252  177520
1447  006606  001413
1448  006610  012701  000252
1449  006614  013702  177520
1450  006620
 (4)  006620  104455
 (5)  006622  000021
 (5)  006624  002656
 (5)  006626  004116
1451  006630
 (3)  006630  104406
1452  006632
 (3)  006632  104432
 (3)  006634  000354

                ERRDF   15,PACR,RERR3          ;REGISTER CANNOT HOLD GOOD DATA
                TRAP    C$ERDF
                .WORD   15
                .WORD   PACR
                .WORD   RERR3
                CKLOOP                        ;LOOP ON ERROR IF SELECTED
                TRAP    C$CLP1
                EXIT    TST                   ;ABORT TEST IF ERROR DETECTED
                TRAP    C$EXIT
                .WORD   L10031-.
3$:             CKLOOP                        ;CHECK FOR LOOP ON ERROR AGAIN
                TRAP    C$CLP1
                ENDSUB
L10034:
                TRAP    C$ESUB

                BGNSUB
                TRAP    C$BSUB
                CLRB    PCR                   ;CLEAR THE REGISTER'S LOW BYTE
                CMP     #125000,PCR           ;COMPARE THE RESULTS
                BEQ     4$                    ;BR IF GOOD DATA
                MOV     #125000,R1            ;EXPECTED DATA
                MOV     PCR,R2                ;COPY CONTENTS
                ERRDF   16,PACR,RERR4         ;BYTE INSTRUCTION ERROR
                TRAP    C$ERDF
                .WORD   16
                .WORD   PACR
                .WORD   RERR4
                CKLOOP                        ;LOOP ON ERROR IF SELECTED
                TRAP    C$CLP1
                EXIT    TST                   ;ABORT TEST IF ERROR DETECTED
                TRAP    C$EXIT
                .WORD   L10031-.
4$:             CKLOOP                        ;CHECK FOR LOOP ON ERROR
                TRAP    C$CLP1
                ENDSUB
L10035:
                TRAP    C$ESUB

                BGNSUB
                TRAP    C$BSUB
                SWAB    PCR                   ;SWAP BYTES
                CMP     #252,PCR              ;CHECK THE RESULTS
                BEQ     5$                    ;BR IF GOOD DATA
                MOV     #252,R1               ;EXPECTED DATA
                MOV     PCR,R2                ;COPY CONTENTS
                ERRDF   17,PACR,RERR4         ;BYTE INSTRUCTION ERROR
                TRAP    C$ERDF
                .WORD   17
                .WORD   PACR
                .WORD   RERR4
                CKLOOP                        ;LOOP ON ERROR IF SELECTED
                TRAP    C$CLP1
                EXIT    TST                   ;ABORT TEST IF ERROR DETECTED
                TRAP    C$EXIT
                .WORD   L10031-.
```

```
1453  006636                          5$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
 (3)  006636  104406                         TRAP    C$CLP1
1454  006640                                 ENDSUB
 (3)  006640                          L10036:
 (3)  006640  104403                         TRAP    C$ESUB
1455  006642                                 BGNSUB
 (3)  006642  104402                         TRAP    C$BSUB
1456  006644  012737  052525  177520        MOV     #052525,PCR             ;LOAD AN ALTERNATING 0'S AND 1'S BIT PATTERN
1457  006652  022737  052525  177520        CMP     #052525,PCR             ;CHECK THE RESULTS
1458  006660  001413                        BEQ     6$                      ;BR IF GOOD DATA
1459  006662  012701  052525                MOV     #052525,R1              ;EXPECTED DATA
1460  006666  013702  177520                MOV     PCR,R2                  ;COPY CONTENTS
1461  006672                                 ERRDF   20,PACR,RERR3           ;REGISTER CANNOT HOLD GOOD DATA
 (4)  006672  104455                         TRAP    C$ERDF
 (5)  006674  000024                        .WORD   20
 (5)  006676  002656                        .WORD   PACR
 (5)  006700  004050                        .WORD   RERR3
1462  006702                                 CKLOOP                          ;LOOP ON ERROR IF SELECTED
 (3)  006702  104406                         TRAP    C$CLP1
1463  006704                                 EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
 (3)  006704  104432                         TRAP    C$EXIT
 (3)  006706  000302                        .WORD   L10031-.
1464  006710                          6$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
 (3)  006710  104406                         TRAP    C$CLP1
1465  006712                                 ENDSUB
 (3)  006712                          L10037:
 (3)  006712  104403                         TRAP    C$ESUB
1466  006714                                 BGNSUB
 (3)  006714  104402                         TRAP    C$BSUB
1467  006716  105037  177521                CLRB    PCR+1                   ;CLEAR THE HIGH BYTE
1468  006722  022737  000125  177520        CMP     #125,PCR                ;CHECK THE REGISTER CONTENTS
1469  006730  001413                        BEQ     7$                      ;BR IF GOOD DATA
1470  006732  012701  000125                MOV     #125,R1                 ;EXPECTED DATA
1471  006736  013702  177520                MOV     PCR,R2                  ;COPY CONTENTS
1472  006742                                 ERRDF   21,PACR,RERR4           ;BYTE INSTRUCTION ERROR
 (4)  006742  104455                         TRAP    C$ERDF
 (5)  006744  000025                        .WORD   21
 (5)  006746  002656                        .WORD   PACR
 (5)  006750  004116                        .WORD   RERR4
1473  006752                                 CKLOOP                          ;LOOP ON ERROR IF SELECTED
 (3)  006752  104406                         TRAP    C$CLP1
1474  006754                                 EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
 (3)  006754  104432                         TRAP    C$EXIT
 (3)  006756  000232                        .WORD   L10031-.
1475  006760                          7$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
 (3)  006760  104406                         TRAP    C$CLP1
1476  006762                                 ENDSUB
 (3)  006762                          L10040:
 (3)  006762  104403                         TRAP    C$ESUB
1477
1478  006764                                 BGNSUB
 (3)  006764  104402                         TRAP    C$BSUB
1479  006766  000337  177520                SWAB    PCR                     ;SWAP BYTES
1480  006772  022737  052400  177520        CMP     #052400,PCR             ;CHECK RESULTING CONTENTS
1481  007000  001413                        BEQ     10$                     ;BR IF GOOD DATA
1482  007002  012701  052400                MOV     #52400,R1               ;EXPECTED DATA
```

```
 1483  007006  013702  177520            MOV     PCR,R2                  ;COPY CONTENTS
 1484  007012                            ERRDF   22,PACR,RERR4           ;BYTE INSTRUCTION ERROR
  (4)  007012  104455                    TRAP    C$ERDF
  (5)  007014  000026                    .WORD   22
  (5)  007016  002656                    .WORD   PACR
  (5)  007020  004116                    .WORD   RERR4
 1485  007022                            CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  007022  104406                    TRAP    C$CLP1
 1486  007024                            EXIT    TST                     ;ABORT TEST IF ERROR DETECTED
  (3)  007024  104432                    TRAP    C$EXIT
  (3)  007026  000162                    .WORD   L10031-.
 1487  007030                     10$:    CKLOOP                          ;CHECK FOR LOOP ON ERROR
  (3)  007030  104406                    TRAP    C$CLP1
 1488  007032                            ENDSUB
  (3)  007032                     L10041:
  (3)  007032  104403                    TRAP    C$ESUB
 1489
 1490  007034                            BGNSUB
  (3)  007034  104402                    TRAP    C$BSUB
 1491  007036  005037  177520            CLR     PCR                     ;MAKE SURE THE C-BIT IS CLEAR
 1492  007042  052737  100000  177520    BIS     #BIT15,PCR              ;SET MSB
 1493  007050  013703  177520            MOV     PCR,R3                  ;COPY DATA IN PCR
 1494  007054  023703  177520   ROTLP3:  CMP     PCR,R3                  ;ARE THEY THE SAME?
 1495  007060  001005                    BNE     11$                     ;BR IF NO
 1496  007062  006003                    ROR     R3                      ;ROTATE THE SET BIT
 1497  007064  001412                    BEQ     12$                     ;BR IF FINISHED
 1498  007066  006037  177520            ROR     PCR                     ;REPEAT ROTATE
 1499  007072  000770                    BR      ROTLP3                  ;LOOP UNTIL ROTATE IS COMPLETE
 1500  007074                     11$:    ERRDF   23,PACR,RERR5
  (4)  007074  104455                    TRAP    C$ERDF
  (5)  007076  000027                    .WORD   23
  (5)  007100  002656                    .WORD   PACR
  (5)  007102  004164                    .WORD   RERR5
 1501  007104                            CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  007104  104406                    TRAP    C$CLP1
 1502  007106                            EXIT    TST                     ;SKIP REST OF TEST
  (3)  007106  104432                    TRAP    C$EXIT
  (3)  007110  000100                    .WORD   L10031-.
 1503  007112                     12$:    CKLOOP                          ;CHECK FOR LOOP ON ERROR
  (3)  007112  104406                    TRAP    C$CLP1
 1504  007114                            ENDSUB
  (3)  007114                     L10042:
  (3)  007114  104403                    TRAP    C$ESUB
 1505
 1506  007116                            BGNSUB
  (3)  007116  104402                    TRAP    C$BSUB
 1507  007120  012737  177777  177520    MOV     #-1,PCR                 ;SET ALL ONES
 1508  007126  042737  100000  177520    BIC     #BIT15,PCR              ;CLEAR MSB
 1509  007134  013703  177520            MOV     PCR,R3                  ;COPY DATA
 1510  007140  023703  177520   ROTLP4:  CMP     PCR,R3                  ;ARE THEY THE SAME?
 1511  007144  001010                    BNE     13$                     ;BR IF NO
 1512  007146  000261                    SEC                             ;SET C-BIT FOR ROTATE
 1513  007150  006037  177520            ROR     PCR                     ;ROTATE CLEAR BIT
 1514  007154  006003                    ROR     R3                      ;REPEAT
 1515  007156  022703  077777            CMP     #077777,R3              ;ALL ONES?
 1516  007162  001366                    BNE     ROTLP4                  ;BR IF NOT YET
```

TEST 2: PAGE CONTROL REGISTER TEST SEQ 0037

```
1517  007164  000407                        BR      14$                     ;SUBTEST FINISHED
1518  007166                        13$:    ERRDF   24,PACR,RERR6
 (4)  007166  104455                        TRAP    C$ERDF
 (5)  007170  000030                        .WORD   24
 (5)  007172  002656                        .WORD   PACR
 (5)  007174  004206                        .WORD   RERR6
1519  007176                              CKLOOP                          ;LOOP ON ERROR IF SELECTED
 (3)  007176  104406                        TRAP    C$CLP1
1520  007200                              EXIT TST
 (3)  007200  104432                        TRAP    C$EXIT
 (3)  007202  000006                        .WORD   L10031-.
1521  007204                        14$:    CKLOOP
 (3)  007204  104406                        TRAP    C$CLP1
1522  007206                              ENDSUB
 (3)  007206                        L10043:
 (3)  007206  104403                        TRAP    C$ESUB
1523  007210                              ENDTST
 (3)  007210                        L10031:
 (3)  007210  104401                        TRAP    C$ETST
1524
1525                                    .SBTTL  TEST 3: BEVENT CLAMP ENABLE TEST
1526                                    ;++
1527                                    ;TEST TO VERIFY THAT THE BEVENT CLAMP CAN BE ENABLED. (IF TESTING A BDV11, THIS
1528                                    ;TEST ASSUMES THAT SWITCH #5 OF E21 IS IN THE ON POSITION, AND THE M8012
1529                                    ;MODULE IS LOCATED IN THE SAME BACKPLANE THAT THE LINE TIME CLOCK
1530                                    ;IS GENERATED FROM.) CHECKS PRIORITY INTERRUPT LEVEL 6 IF IT WAS
1531                                    ;CHANGED IN HARDWARE TABLE AND IF THE DEVICE UNDER TEST IS KDF11-B.
1532
1533                                    ;--
1534
1535  007212                                    BGNTST
1536
1537          177546                            BEVREG=177546
1538
1539  007212  005737  002306                   TST     PASS            ;IF THIS IS FIRST PASS
1540  007216  001402                            BEQ     1$              ;THEN DO THE TEST
1541  007220                                    EXIT    TST             ;ELSE DON'T
 (3)  007220  104432                            TRAP    C$EXIT
 (3)  007222  001362                            .WORD   L10044-.
1542  007224  005037  007716            1$:     CLR     ICOUNT
1543  007230                                    BGNSUB
 (3)  007230  104402                            TRAP    C$BSUB
1544  007232                                    SETVEC  VECT,#INTSR,#PRI07      ;SET INTERRUPT VECTOR,INHIBIT INTERRUPTS
 (7)  007232  012746  000340                    MOV     #PRI07,-(SP)
 (6)  007236  012746  007710                    MOV     #INTSR,-(SP)
 (5)  007242  013746  002316                    MOV     VECT,-(SP)
 (4)  007246  012746  000003                    MOV     #3,-(SP)
 (3)  007252  104437                            TRAP    C$SVEC
 (2)  007254  062706  000010                    ADD     #10,SP
1545  007260  052737  000100  177546           BIS     #BIT06,BEVREG           ;REMOVE BEVENT CLAMP
1546  007266                                    SETPRI  #PRI00                  ;ALLOW INTERRUPTS
 (3)  007266  012700  000000                    MOV     #PRI00,R0
 (3)  007272  104441                            TRAP    C$SPRI
1547  007274  004537  005234                   JSR     R5,WDELAY               ;DELAY APPROX. 40 MSECS.
1548  007300  000050                           40.
1549  007302                                    SETPRI  #PRI07                  ;INHIBIT FURTHER INTERRUPTS
```

```
                        MOV     #PRI07,R0
                        TRAP    C$SPRI
                        CMP     #2,ICOUNT               ;DID THE MINIMUM OF TWO INTERRUPTS OCCUR?
                        BLE     2$                      ;BR IF YES
                        ERRDF   25.,BVERR1              ;BEVENT CLAMP ENABLE FAILED
                        TRAP    C$ERDF
                        .WORD   25
                        .WORD   0
                        .WORD   BVERR1
                2$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
                        TRAP    C$CLP1
                        CLR     ICOUNT                  ;CLEAR INTERRUPT COUNT
                        ENDSUB
                L10045:
                        TRAP    C$ESUB

                        BGNSUB
                        TRAP    C$BSUB
                        BIC     #BIT06,BEVREG           ;SET BEVENT CLAMP
                        SETPRI  #PRI00                  ;ALLOW INTERRUPTS
                        MOV     #PRI00,R0
                        TRAP    C$SPRI
                        JSR     R5,WDELAY               ;DELAY APPROX. 40 MSECS
                        40.                             ;DELAY COUNT
                        SETPRI  #PRI07                  ;SET HIGHEST PRIORITY
                        MOV     #PRI07,R0
                        TRAP    C$SPRI
                        CMP     #1,ICOUNT               ;CHECK INTERRUPT COUNT
                        BGE     4$                      ;BR IF NO INTERRUPTS OCCURRED
                        ERRDF   26.,BVERR2              ;BEVENT CLAMP DID NOT PREVENT INTERRUPTS
                        TRAP    C$ERDF
                        .WORD   26
                        .WORD   0
                        .WORD   BVERR2
                4$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
                        TRAP    C$CLP1
                        CLR     ICOUNT                  ;CLEAR INTERRUPT COUNT
                        ENDSUB
                L10046:
                        TRAP    C$ESUB

                        CMP     #6,PRIOR                ;WAS PRIORITY CHANGED?
                        BEQ     100$                    ;IF YES, BRANCH
                        TST     KDF11B                  ;KDF11B ?
                        BNE     100$                    ;IF YES, BRANCH
                        EXIT    TST                     ;NO,EXIT
                        TRAP    C$EXIT
                        .WORD   L10044-.

                100$:   BGNSUB
                        TRAP    C$BSUB
                        BIS     #BIT06,BEVREG           ;REMOVE BEVENT CLAMP
                        SETPRI  #PRI05                  ;ALLOW INTERRUPTS AT 5
                        MOV     #PRI05,R0
                        TRAP    C$SPRI
                        JSR     R5,WDELAY               ;DELAY APPROX. 40 MSECS.
```

```
 1580  007466  000050                          40.
 1581  007470                                  SETPRI  #PRI07                  ;INHIBIT FURTHER INTERRUPTS
   (3) 007470  012700  000340                  MOV     #PRI07,R0
   (3) 007474  104441                          TRAP    C$SPRI
 1582  007476  022737  000002  007716          CMP     #2.ICOUNT               ;DID THE MINIMUM OF TWO INTERRUPTS OCCUR?
 1583  007504  003404                          BLE     101$                    ;BR IF YES
 1584  007506                                  ERRDF   52.,BVERR4              ;PRIORITY IS WRONG
   (4) 007506  104455                          TRAP    C$ERDF
   (5) 007510  000064                          .WORD   52
   (5) 007512  000000                          .WORD   0
   (5) 007514  010102                          .WORD   BVERR4
 1585  007516                          101$:   CKLOOP                          ;CHECK FOR LOOP ON ERROR
   (3) 007516  104406                          TRAP    C$CLP1
 1586  007520  005037  007716                  CLR     ICOUNT                  ;CLEAR INTERRUPT COUNT
 1587  007524                                  ENDSUB
   (3) 007524                          L10047:
   (3) 007524  104403                          TRAP    C$ESUB
 1588
 1589  007526                                  BGNSUB
   (3) 007526  104402                          TRAP    C$BSUB
 1590  007530  052737  000100  177546          BIS     #BIT06,BEVREG           ;REMOVE BEVENT CLAMP
 1591  007536                                  SETPRI  #PRI06                  ;DON'T ALLOW INTERRUPTS
   (3) 007536  012700  000300                  MOV     #PRI06,R0
   (3) 007542  104441                          TRAP    C$SPRI
 1592  007544  004537  005234                  JSR     R5,WDELAY               ;DELAY APPROX. 40 MSECS
 1593  007550  000050                          40.                             ;DELAY COUNT
 1594  007552                                  SETPRI  #PRI07                  ;SET PRIORITY 7
   (3) 007552  012700  000340                  MOV     #PRI07,R0
   (3) 007556  104441                          TRAP    C$SPRI
 1595  007560  022737  000001  007716          CMP     #1,ICOUNT               ;CHECK INTERRUPT COUNT
 1596  007566  002004                          BGE     102$                    ;BR IF NO INTERRUPTS OCCURRED
 1597  007570                                  ERRDF   53.,BVERR5              ;PRIOR. 6 DIDN'T PREVENT INTERR.
   (4) 007570  104455                          TRAP    C$ERDF
   (5) 007572  000065                          .WORD   53
   (5) 007574  000000                          .WORD   0
   (5) 007576  010150                          .WORD   BVERR5
 1598  007600                          102$:   CKLOOP                          ;CHECK FOR LOOP ON ERROR
   (3) 007600  104406                          TRAP    C$CLP1
 1599  007602  005037  007716                  CLR     ICOUNT                  ;CLEAR INTERRUPT COUNT
 1600  007606                                  ENDSUB
   (3) 007606                          L10050:
   (3) 007606  104403                          TRAP    C$ESUB
 1601
 1602  007610  005737  002262                  TST     KDF11B                  ;KDF11B ?
 1603  007614  001002                          BNE     5$
 1604  007616                                  EXIT    TST
   (3) 007616  104432                          TRAP    C$EXIT
   (3) 007620  000764                          .WORD   L10044-.
 1605
 1606  007622                          5$:     BGNSUB                          ;SET INTERRUPTS
   (3) 007622  104402                          TRAP    C$BSUB
 1607  007624  052737  000100  177546          BIS     #BIT06,BEVREG
 1608  007632                                  BRESET                          ;RESET INTERRUPTS
   (3) 007632  104433                          TRAP    C$RESET
 1609  007634                                  SETPRI  #PRI00                  ;WITH LOW PRIORITY
   (3) 007634  012700  000000                  MOV     #PRI00,R0
```

```
   (3)  007640  104441                        TRAP    C$SPRI
 1610   007642  004537  005234                JSR     R5,WDELAY           ;DELAY APPROX. 40 MSECS
 1611   007646  000050                        40.
 1612   007650                                SETPRI  #PRI07
   (3)  007650  012700  000340                MOV     #PRI07,R0
   (3)  007654  104441                        TRAP    C$SPRI
 1613   007656  005737  007716                TST     ICOUNT              ;0 INTERRUPTS ?
 1614   007662  001404                        BEQ     6$                  ;IF YES BRANCH
 1615   007664                                ERRDF   51,,BVERR3          ;RESET DIDN'T WORK
   (4)  007664  104455                        TRAP    C$ERDF
   (5)  007666  000063                        .WORD   51
   (5)  007670  000000                        .WORD   0
   (5)  007672  010034                        .WORD   BVERR3
 1616   007674                        6$:     CKLOOP                      ;CHECK FOR LOOP ON ERROR
   (3)  007674  104406                        TRAP    C$CLP1
 1617   007676  005037  007716                CLR     ICOUNT
 1618   007702                                ENDSUB
   (3)  007702                        L10051:
   (3)  007702  104403                        TRAP    C$ESUB
 1619   007704                                EXIT    TST
   (3)  007704  104432                        TRAP    C$EXIT
   (3)  007706  000676                        .WORD   L10044-.
 1620
 1621   007710                        INTSR:
 1622   007710                                BGNSRV  BEVENT              ;INTERRUPT SERVICE ROUTINE
   (3)  007710                        BEVENT::
 1623   007710  005237  007716                INC     ICOUNT              ;INCREMENT COUNTER
 1624   007714                                ENDSRV
   (3)  007714                        L10052:
   (2)  007714  000002                        RTI
 1625
 1626   007716  000000                ICOUNT: .WORD   0
 1627
 1628   007720                                BGNMSG  BVERR1
   (3)  007720                        BVERR1::
 1629   007720                                PRINTB  #MSG1
   (7)  007720  012746  010216                MOV     #MSG1,-(SP)
   (6)  007724  012746  000001                MOV     #1,-(SP)
   (3)  007730  010600                        MOV     SP,R0
   (4)  007732  104414                        TRAP    C$PNTB
   (4)  007734  062706  000004                ADD     #4,SP
 1630   007740                                PRINTB  #INTCT,ICOUNT
   (8)  007740  013746  007716                MOV     ICOUNT,-(SP)
   (7)  007744  012746  010272                MOV     #INTCT,-(SP)
   (6)  007750  012746  000002                MOV     #2,-(SP)
   (3)  007754  010600                        MOV     SP,R0
   (4)  007756  104414                        TRAP    C$PNTB
   (4)  007760  062706  000006                ADD     #6,SP
 1631   007764                                ENDMSG
   (3)  007764                        L10053:
   (3)  007764  104423                        TRAP    C$MSG
 1632
 1633   007766                                BGNMSG  BVERR2
   (3)  007766                        BVERR2::
 1634   007766                                PRINTB  #MSG2
   (7)  007766  012746  010341                MOV     #MSG2,-(SP)
```

```
   (6)  007772  012746  000001                MOV     #1,-(SP)
   (3)  007776  010600                        MOV     SP,R0
   (4)  010000  104414                        TRAP    C$PNTB
   (4)  010002  062706  000004                ADD     #4,SP
 1635   010006                                PRINTB  #!NTCT,ICOUNT
   (8)  010006  013746  007716                MOV     ICOUNT,-(SP)
   (7)  010012  012746  010272                MOV     #INTCT,-(SP)
   (6)  010016  012746  000002                MOV     #2,-(SP)
   (3)  010022  010600                        MOV     SP,R0
   (4)  010024  104414                        TRAP    C$PNTB
   (4)  010026  062706  000006                ADD     #6,SP
 1636   010032                                ENDMSG
   (3)  010032                          L10054:
   (3)  010032  104423                        TRAP    C$MSG
 1637
 1638   010034                                BGNMSG  BVERR3
   (3)  010034                          BVERR3::
 1639   010034                                PRINTB  #MSG3
   (7)  010034  012746  010415                MOV     #MSG3,-(SP)
   (6)  010040  012746  000001                MOV     #1,-(SP)
   (3)  010044  010600                        MOV     SP,R0
   (4)  010046  104414                        TRAP    C$PNTB
   (4)  010050  062706  000004                ADD     #4,SP
 1640   010054                                PRINTB  #INTCT,ICOUNT
   (8)  010054  013746  007716                MOV     ICOUNT,-(SP)
   (7)  010060  012746  010272                MOV     #INTCT,-(SP)
   (6)  010064  012746  000002                MOV     #2,-(SP)
   (3)  010070  010600                        MOV     SP,R0
   (4)  010072  104414                        TRAP    C$PNTB
   (4)  010074  062706  000006                ADD     #6,SP
 1641   010100                                ENDMSG
   (3)  010100                          L10055:
   (3)  010100  104423                        TRAP    C$MSG
 1642
 1643   010102                                BGNMSG  BVERR4
   (3)  010102                          BVERR4::
 1644   010102                                PRINTB  #MSG4
   (7)  010102  012746  010462                MOV     #MSG4,-(SP)
   (6)  010106  012746  000001                MOV     #1,-(SP)
   (3)  010112  010600                        MOV     SP,R0
   (4)  010114  104414                        TRAP    C$PNTB
   (4)  010116  062706  000004                ADD     #4,SP
 1645   010122                                PRINTB  #INTCT,ICOUNT
   (8)  010122  013746  007716                MOV     ICOUNT,-(SP)
   (7)  010126  012746  010272                MOV     #INTCT,-(SP)
   (6)  010132  012746  000002                MOV     #2,-(SP)
   (3)  010136  010600                        MOV     SP,R0
   (4)  010140  104414                        TRAP    C$PNTB
   (4)  010142  062706  000006                ADD     #6,SP
 1646   010146                                ENDMSG
   (3)  010146                          L10056:
   (3)  010146  104423                        TRAP    C$MSG
 1647
 1648   010150                                BGNMSG  BVERR5
   (3)  010150                          BVERR5::
 1649   010150                                PRINTB  #MSG5
```

```
   (7)  010150  012746  010532                    MOV     #MSG5,-(SP)
   (6)  010154  012746  000001                    MOV     #1,-(SP)
   (3)  010160  010600                            MOV     SP,R0
   (4)  010162  104414                            TRAP    C$PNTB
   (4)  010164  062706  000004                    ADD     #4,SP
  1650  010170                                    PRINTB  #INICT,ICOUNT
   (8)  010170  013746  007716                    MOV     ICOUNT,-(SP)
   (7)  010174  012746  010272                    MOV     #INTCT,-(SP)
   (6)  010200  012746  000002                    MOV     #2,-(SP)
   (3)  010204  010600                            MOV     SP,R0
   (4)  010206  104414                            TRAP    C$PNTB
   (4)  010210  062706  000006                    ADD     #6,SP
  1651  010214                                    ENDMSG
   (3)  010214                            L10057:
   (3)  010214  104423                            TRAP    C$MSG
  1652
  1653  010216  040445  042502  042526  MSG1:    .ASCIZ  /%ABEVENT CLAMP FAILED TO ALLOW INTERRUPTS%N/
        010224  052116  041440  040514
        010232  050115  043040  044501
        010240  042514  020104  047524
        010246  040440  046114  053517
        010254  044440  052116  051105
        010262  052522  052120  022523
        010270  000116
  1654  010272  040445  052516  041115  INTCT:   .ASCIZ  /%ANUMBER OF INTERRUPTS RECEIVED: %03%N/
        010300  051105  047440  020106
        010306  047111  042524  051122
        010314  050125  051524  051040
        010322  041505  044505  042526
        010330  035104  022440  031517
        010336  047045     000
  1655  010341     045  041101  053105  MSG2:    .ASCIZ  /%ABEVENT CLAMP DID NOT PREVENT INTERRUPTS%N/
        010346  047105  020124  046103
        010354  046501  020120  044504
        010362  020104  047516  020124
        010370  051120  053105  047105
        010376  020124  047111  042524
        010404  051122  050125  051524
        010412  047045     000
  1656  010415     045  051101  051505  MSG3:    .ASCIZ  /%ARESET DID NOT PREVENT INTERRUPTS%N/
        010422  052105  042040  042111
        010430  047040  052117  050040
        010436  042522  042526  052116
        010444  044440  052116  051105
        010452  052522  052120  022523
        010460  000116
  1657  010462  040445  051120  047511  MSG4:    .ASCIZ  /%APRIORITY 5 DID NOT ALLOW INTERRUPTS%N/
        010470  044522  054524  032440
        010476  042040  042111  047040
        010504  052117  040440  046114
        010512  053517  044440  052116
        010520  051105  052522  052120
        010526  022523  000116
  1658  010532  040445  051120  047511  MSG5:    .ASCIZ  /%APRIORITY 6 DID NOT PREVENT INTERRUPTS%N/
        010540  044522  054524  033040
        010546  042040  042111  047040
```

```
        010554  052117  050040  042522
        010562  042526  052116  044440
        010570  052116  051105  052522
        010576  052120  022523  000116
1659                                            .EVEN
1660    010604                                  ENDTST
 (3)    010604                          L10044:
 (3)    010604  104401                          TRAP    C$ETST
1661                                    .SBTTL  TEST 4: LIGHT DISPLAY TEST
1662                                    ;++
1663                                    ;TEST TO VERIFY THAT THE FOUR RED LED'S ARE WORKING AND CAN BE
1664                                    ;TURNED ON INDIVIDUALLY.
1665                                    ;--
1666
1667    010606                                  BGNTST
1668
1669    010606  005037  177524                 CLR     LSREG                   ;TURN ON ALL FOUR LED'S
1670    010612  004537  005234                 JSR     R5,WDELAY               ;DELAY APPROX. 200MS
1671    010616  000310                         200.
1672    010620                                  BREAK                           ;CHECK SUPERVISOR FOR CONTROL REQUESTS
 (3)    010620  104422                         TRAP    C$BRK
1673    010622  012737  000017  177524         MOV     #17,LSREG               ;TURN OFF ALL FOUR LED'S
1674    010630  004537  005234                 JSR     R5,WDELAY               ;DELAY APPROX. 200 MS
1675    010634  000310                         200.
1676    010636                                  MANUAL                          ;IS MANUAL INTERVENTION ALLOWED?
 (3)    010636  104450                         TRAP    C$MANI
1677    010640                                  BCOMPLETE       2$              ;BR IF YES
 (2)    010640  103410                         BCS     2$
1678    010642  022737  000030  002310         CMP     #30,PASCT               ;IS PASS COUNT >= 30?
1679    010650  003402                         BLE     1$                      ;BR IF YES
1680    010652                                  EXIT    TST
 (3)    010652  104432                         TRAP    C$EXIT
 (3)    010654  000100                         .WORD   L10060-.
1681    010656  005037  002310          1$:    CLR     PASCT                   ;EXIT TEST
1682    010662  012737  000016  177524  2$:    MOV     #16,LSREG               ;TURN ON THE LED CORRESPONDING TO THE LSB
1683    010670  004537  005234                 JSR     R5,WDELAY               ;DELAY APPROX. 200MS
1684    010674  000310                         200.
1685    010676                                  BREAK                           ;CHECK SUPR FOR CONTROL REQUESTS
 (3)    010676  104422                         TRAP    C$BRK
1686    010700  012737  000015  177524         MOV     #15,LSREG               ;TURN ON 2ND LED
1687    010706  004537  005234                 JSR     R5,WDELAY               ;DELAY APPROX 200 MS
1688    010712  000310                         200.
1689    010714                                  BREAK                           ;CHECK SUPERVISOR FOR CONTROL COMMANDS
 (3)    010714  104422                         TRAP    C$BRK
1690    010716  012737  000013  177524         MOV     #13,LSREG               ;TURN ON 3RD LED
1691    010724  004537  005234                 JSR     R5,WDELAY               ;DELAY APPROX 200MS
1692    010730  000310                         200.
1693    010732                                  BREAK                           ;CHECK SUPR FOR CONTROL REQUESTS
 (3)    010732  104422                         TRAP    C$BRK
1694    010734  012737  000007  177524         MOV     #7,LSREG                ;TURN ON LED CORRESPONDING TO MSB
1695    010742  004537  005234                 JSR     R5,WDELAY               ;DELAY APPROX 200MS
1696    010746  000310                         200.
1697    010750                                  EXIT    TST                     .EXIT
 (3)    010750  104432                         TRAP    C$EXIT
 (3)    010752  000002                         .WORD   L10060-.
1698
```

```
 1699  010754                                      ENDTST
  (3)  010754                                L10060:
  (3)  010754  104401                               TRAP    C$ETST
 1700
 1701                                       .SBTTL  TEST 5: ROCKER SWITCHES TEST
 1702                                       ;TEST TO CONFIRM THE ROCKER SWITCH SETTINGS. THIS TEST ASSUMES THAT,
 1703                                       ;IN MANUFACTURING, THE ROCKER SWITCHES ARE ALL IN THE ON POSITION.
 1704                                       ;THIS INCLUDES BOTH E21 AND E15 ON THE BDV11, OR SWITCH E102 ON THE KDF11-B. IN
 1705                                       ;MANUFACTURING, THIS TEST WILL VERIFY THAT ALL SWITCHES CAN BE READ AS ON. IN,
 1706                                       ;OTHER ENVIRONMENTS THE OPERATOR MAY SPECIFY WHAT THE SWITCH SETTINGS ARE BEFORE
 1707                                       ;THE DIAGNOSTIC IS STARTED (SEE PROGRAM OPTIONS UNDER OPERATING
 1708                                       ;INSTRUCTIONS). SWITCHES A1-A8 CORRESPOND TO E15 AND SWITCHES
 1709                                       ;B1-B4 TO E21 ON THE BDV11.
 1710  010756                                      BGNTST
 1711
 1712  010756                                      MANUAL                          ;IS MANUAL INTERVENTION ALLOWED?
  (3)  010756  104450                               TRAP    C$MANI
 1713  010760                                      BCOMPLETE       PRTSW           ;BR IF YES
  (2)  010760  103420                               BCS     PRTSW
 1714  010762  005737  002262                      TST     KDF11B                  ;IF THIS IS A KDF11-B...
 1715  010766  001402                              BEQ     3$
 1716  010770  105037  002321                      CLRB    SWSET+1                 ;...THEN JUST LOOK AT 8 SWITCHES
 1717  010774  023737  002320  177524  3$:       CMP     SWSET,LSREG             ;ALL SWITCHES SHOULD BE ON & BITS 0-11..
 1718                                                                              ;...(OR BITS 0-7 IF ON A KDF11-B)...
 1719                                                                              ;...SHOULD BE SET.
 1720  011002  001404                              BEQ     1$                      ;BR IF SWITCH READINGS ARE OK
 1721  011004                                      ERRDF   27,,SWERR               ;CANNOT READ SWITCHES PROPERLY
  (4)  011004  104455                               TRAP    C$ERDF
  (5)  011006  000033                               .WORD   27
  (5)  011010  000000                               .WORD   0
  (5)  011012  011354                               .WORD   SWERR
 1722  011014                              1$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
  (3)  011014  104406                               TRAP    C$CLP1
 1723  011016                                      EXIT    TST                     ;EXIT
  (3)  011016  104432                               TRAP    C$EXIT
  (3)  011020  000566                               .WORD   L10061-.
 1724  011022  013737  177524  011350  PRTSW:     MOV     LSREG,TEMP              ;COPY CONTENTS OF LSREG
 1725  011030  005037  011352                      CLR     SWCHON                  ;CLEAR MASK
 1726  011034  012737  000014  011346              MOV     #14,SWCNT               ;SET SWITCH COUNT
 1727  011042  005737  002262                      TST     KDF11B                  ;IF THIS IS A KDF11-B...
 1728  011046  001403                              BEQ     LP
 1729  011050  012737  000010  011346              MOV     #10,SWCNT               ;...THEN JUST TEST FOR 8 SWITCHES
 1730  011056  032737  000001  011350  LP:       BIT     #BIT0,TEMP              ;TEST FOR SWITCH SET
 1731  011064  001412                              BEQ     2$                      ;BR IF NOT SET
 1732  011066  005737  002262                      TST     KDF11B                  ;SEE IF WE ARE ON A KDF11B
 1733  011072  001404                              BEQ     4$                      ;BRANCH IF NOT
 1734  011074  052737  004000  011352              BIS     #BIT11,SWCHON           ;SET CORRESPONDING BIT IN MASK
 1735  011102  000403                              BR      2$
 1736  011104  052737  100000  011352  4$:       BIS     #BIT15,SWCHON           ;IF SET, THEN SET CORRESPNDING BIT IN MASK
 1737  011112  000241                      2$:     CLC                             ;CLEAR C-BIT FOR ROTATE
 1738  011114  006037  011352                      ROR     SWCHON                  ;ROTATE SWSET
 1739  011120  006037  011350                      ROR     TEMP                    ;GET READY TO TEST NEXT SWITCH
 1740  011124  005337  011346                      DEC     SWCNT                   ;DECREMENT SWITCH COUNT
 1741  011130  001352                              BNE     LP                      ;LOOP UNTIL ALL SWITCHES HAVE BEEN CHECKED
 1742  011132  000241                              CLC                             ;CLEAR C-BIT FOR ROTATE
 1743  011134  006037  011352                      ROR     SWCHON                  ;ROTATE DATA
```

```
1744  011140  006037  011352                ROR     SWCHON                  ;ROTATE DATA
1745  011144  006037  011352                ROR     SWCHON                  ;ROTATE DATA
1746  011150                               PRINTF  #READN,SWCHON           ;PRINT SWITCH SETTINGS
 (8)  011150  013746  011352                MOV     SWCHON,-(SP)
 (7)  011154  012746  011406                MOV     #READN,-(SP)
 (6)  011160  012746  000002                MOV     #2,-(SP)
 (3)  011164  010600                        MOV     SP,R0
 (4)  011166  104417                        TRAP    C$PNTF
 (4)  011170  062706  000006                ADD     #6,SP
1747
1748  011174  013702  011352                MOV     SWCHON,R2               ;COPY SWITCH SETTINGS
1749  011200  012701  000001                MOV     #1,R1                   ;SET SWITCH NUMBER = 1
1750  011204  032702  000001     TAG1:      BIT     #BIT0,R2                ;IS THIS SWITCH ON?
1751  011210  001411                        BEQ     TAG2                    ;BR IF NO
1752  011212                               PRINTF  #MESSG1,R1              ;PRINT SWITCH NUMBER
 (8)  011212  010146                        MOV     R1,-(SP)
 (7)  011214  012746  011441                MOV     #MESSG1,-(SP)
 (6)  011220  012746  000002                MOV     #2,-(SP)
 (3)  011224  010600                        MOV     SP,R0
 (4)  011226  104417                        TRAP    C$PNTF
 (4)  011230  062706  000006                ADD     #6,SP
1753  011234  005201     TAG2:      INC     R1                      ;INCREMENT SWITCH NUMBER
1754  011236  006002                        ROR     R2                      ;ROTATE SWITCH REGISTER
1755  011240  022701  000010                CMP     #10,R1                  ;;FINISHED WITH E15 ON BDV11
1756                                                                        ;;OR E102 ON KDF11-B?
1757  011244  002357                        BGE     TAG1                    ;BR IF NO
1758  011246  005737  002262                TST     KDF11B                  ;SEE IF WE ARE ON A KDF11-B
1759  011252  001023                        BNE     TAG4A                   ;BRANCH IF YES
1760  011254  012701  000001                MOV     #1,R1                   ;RESET SWITCH NUMBER FOR E21 ON BDV11
1761  011260  032702  000001     TAG3:      BIT     #BIT0,R2                ;IS THIS SWITCH SET?
1762  011264  001411                        BEQ     TAG4                    ;BR IF NO
1763  011266                               PRINTF  #MESSG2,R1              ;PRINT SWITCH NUMBER
 (8)  011266  010146                        MOV     R1,-(SP)
 (7)  011270  012746  011454                MOV     #MESSG2,-(SP)
 (6)  011274  012746  000002                MOV     #2,-(SP)
 (3)  011300  010600                        MOV     SP,R0
 (4)  011302  104417                        TRAP    C$PNTF
 (4)  011304  062706  000006                ADD     #6,SP
1764  011310  005201     TAG4:      INC     R1                      ;INCREMENT SWITCH NUMBER
1765  011312  006002                        ROR     R2                      ;ROTATE SWITCH REGISTER
1766  011314  022701  000004                CMP     #4,R1                   ;FINISHED?
1767  011320  002357                        BGE     TAG3                    ;BR IF NO
1768  011322                     TAG4A:     PRINTF  #NEWLIN
 (7)  011322  012746  011467                MOV     #NEWLIN,-(SP)
 (6)  011326  012746  000001                MOV     #1,-(SP)
 (3)  011332  010600                        MOV     SP,R0
 (4)  011334  104417                        TRAP    C$PNTF
 (4)  011336  062706  000004                ADD     #4,SP
1769
1770  011342                               EXIT TST
 (3)  011342  104432                        TRAP    C$EXIT
 (3)  011344  000242                        .WORD   L10061-.
1771
1772  011346  000000     SWCNT:     .WORD   0
1773  011350  000000     TEMP:      .WORD   0
1774  011352  000000     SWCHON:    .WORD   0
```

```
 1775
 1776  011354                                  BGNMSG  SWERR
  (3)  011354                          SWERR::
 1777  011354                                  PRINTB  #SERR1,SWSET,LSREG
  (9)  011354  013746  177524                 MOV     LSREG,-(SP)
  (8)  011360  013746  002320                 MOV     SWSET,-(SP)
  (7)  011364  012746  011472                 MOV     #SERR1,-(SP)
  (6)  011370  012746  000003                 MOV     #3,-(SP)
  (3)  011374  010600                         MOV     SP,R0
  (4)  011376  104414                         TRAP    C$PNTB
  (4)  011400  062706  000010                 ADD     #10,SP
 1778  011404                                  ENDMSG
  (3)  011404                          L10062:
  (3)  011404  104423                         TRAP    C$MSG
 1779
 1780  011406  047045  040445  053523  READN:  .ASCIZ  /%N%ASWITCHES ON : %O6%A : /
       011414  052111  044103  051505
       011422  047440  020116  020072
       011430  047445  022466  020101
       011436  020072     000
 1781  011441     045  040501  042045  MESSG1: .ASCIZ  /%AA%D1%A, /
       011446  022461  026101  000040
 1782  011454  040445  022502  030504  MESSG2: .ASCIZ  /%AB%D1%A, /
       011462  040445  020054     000
 1783  011467     045  000116          NEWLIN: .ASCIZ  /%N/
 1784  011472  040445  044504  020104  SERR1:  .ASCII  /%ADID NOT RECOGNIZE ALL SWITCHES AS ON%N/
       011500  047516  020124  042522
       011506  047503  047107  055111
       011514  020105  046101  020114
       011522  053523  052111  044103
       011530  051505  040440  020123
       011536  047117  047045
 1785  011542  040445  054105  042520          .ASCIZ  /%AEXPECTED: %O6%S5%ARECEIVED:%O6%N/
       011550  052103  042105  020072
       011556  047445  022466  032523
       011564  040445  042522  042503
       011572  053111  042105  022472
       011600  033117  047045     000
 1786        011606                          .EVEN
 1787  011606                                ENDTST
  (3)  011606                          L10061:
  (3)  011606  104401                         TRAP    C$ETST
 1788
 1789                                .SBTTL  TEST 6: 2K OR 8K DIAGNOSTIC ROM
 1790                                ;++
 1791                                ;TEST TO PERFORM CHECKSUM AND CHECKWORD VERIFICATION ON THE 2K OR 8K
 1792                                ;OF DIAGNOSTIC ROM. IN UNATTENDED MODE, THE ROM WILL BE ADDRESSED
 1793                                ;FROM 0-2K. IN STAND-ALONE MODE, THE OPERATOR MAY CHANGE THE
 1794                                ;ADDRESS BY RESPONDING TO QUESTIONS GENERATED ON THE FIRST PASS.
 1795                                ;THE DIAGNOSTIC ROM IS 8K FOR THE MICRO PDP-11.
 1796                                ;--
 1797  011610                                BGNTST
 1798
 1799  011610                                BGNSUB
  (3)  011610  104402                         TRAP    C$BSUB
 1800  011612                                MANUAL                          ;MANUAL INTERVENTION OK?
```

```
  (3)  011612  104450                        TRAP    C$MANI
1801   011614                                BNCOMPLETE      STRT            ;BR IF NO
  (2)  011614  103014                        BCC     STRT
1802   011616  005737  002306                TST     PASS                    ;FIRST PASS?
1803   011622  001032                        BNE     RSTRT                   ;BR IF NO
1804   011624                                GMANIL  DADDR,RSET,1,YES
  (3)  011624  104443                        TRAP    C$GMAN
  (3)  011626  000404                        BR      10000$
  (4)  011630  002336                        .WORD   RSET
  (5)  011632  000130                        .WORD   T$CODE
  (5)  011634  014272                        .WORD   DADDR
  (5)  011636  000001                        .WORD   1
  (3)  011640                        10000$:
1805   011640  005737  002336                TST     RSET                    ;STANDARD JUMPERS?
1806   011644  001404                        BEQ     GETAD                   ;BR IF NO
1807   011646  012737  000400  012724  STRT: MOV     #400,DRLP               ;STORE STARTING ADDRESS
1808   011654  000415                        BR      RSTRT                   ;GO PERFORM TEST
1809   011656                        GETAD:  GMANID  LOADR,STORE,D,-1,0,24,NO
  (3)  011656  104443                        TRAP    C$GMAN
  (3)  011660  000406                        BR      10001$
  (4)  011662  002322                        .WORD   STORE
  (5)  011664  000042                        .WORD   T$CODE
  (5)  011666  003074                        .WORD   LOADR
  (5)  011670  177777                        .WORD   -1
  (5)  011672  000000                        .WORD   T$LOLIM
  (5)  011674  000024                        .WORD   T$HILIM
  (3)  011676                        10001$:
1810   011676  004737  005144                JSR     PC,SETADR               ;GET STARTING ADDRESS
1811   011702  013737  002272  012724        MOV     LOPAG,DRLP              ;STORE STARTING ADDRESS
1812   011710  013737  012724  002264  RSTRT: MOV     DRLP,VRTPCR             ;SET UP PCR
1813   011716  013737  002264  177520        MOV     VRTPCR,PCR
1814   011724  005737  002260          DRTST: TST     @#LCP                   ;ARE WE RUNNING ON A MICRO PDP-11 ?
1815   011730  001404                        BEQ     5$                      ;NO,THEN WE ONLY HAVE 8 CHECKWORDS
1816   011732  012737  000040  002274        MOV     #40,COUNTR              ;YES,FOR MICRO PDP-11 WE HAVE 32 CHECKWORDS
1817   011740  000403                        BR      10$                     ;GO CHECK THEM
1818   011742  012737  000010  002274  5$:   MOV     #10,COUNTR              ;8 CHECKWORDS TO CHECK
1819   011750  012705  002160        10$:   MOV     #SFPTBL,R5              ;LOCATION OF CHECKWORDS
1820   011754  012737  000001  002300        MOV     #1,RFLAG                ;INDICATE ROM
1821   011762  005037  002266          D.OOP: CLR     BCF                     ;SIGNAL LOW BYTES ARE BEING CHECKED
1822   011766  122737  177777  173774        CMPB    #-1,@#173774            ;DOES THE ROM EXIST?
1823   011774  001007                        BNE     1$                      ;BR IF YES
1824   011776                                ERRDF   30,,DERR1               ;LOW BYTE DIAGNOSTIC ROM NOT FOUND
  (4)  011776  104455                        TRAP    C$ERDF
  (5)  012000  000036                        .WORD   30
  (5)  012002  000000                        .WORD   0
  (5)  012004  012726                        .WORD   DERR1
1825   012006                                CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  012006  104406                        TRAP    C$CLP1
1826   012010                                EXIT    TST                     ;EXIT TEST,ROM NOT FOUND
  (3)  012010  104432                        TRAP    C$EXIT
  (3)  012012  002302                        .WORD   L10063-.
1827   012014                          1$:   CKLOOP                          ;CHECK FOR LOOP ON ERROR
  (3)  012014  104406                        TRAP    C$CLP1
1828   012016  004737  004302                JSR     PC,CHKSUM               ;COMPUTE THE ACTUAL CHECKSUM
1829   012022  113737  173776  002302        MOVB    @#173776,EXPSUM         ;GET THE STORED CHECKSUM
1830   012030  063737  002304  002302        ADD     ACTSUM,EXPSUM           ;ADD THE EXPECTED AND ACTUAL CHECKSUMS
```

```
 1831  012036  105737  002302                 TSTB    EXPSUM                  ;BYTE RESULT = 0?
 1832  012042  001404                         BEQ     2$                      ;BR IF YES
 1833  012044                                 ERRDF   31,,DERR2               ;CHECKSUM ERROR IN DIAGNOSTIC ROM
  (4)  012044  104455                         TRAP    C$ERDF
  (5)  012046  000037                         .WORD   31
  (5)  012050  000000                         .WORD   0
  (5)  012052  012754                         .WORD   DERR2
 1834  012054                         2$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
  (3)  012054  104406                         TRAP    C$CLP1
 1835  012056                                 ENDSUB
  (3)  012056                         L10064:
  (3)  012056  104403                         TRAP    C$ESUB
 1836
 1837
 1838  012060                                 BGNSUB
  (3)  012060  104402                         TRAP    C$BSUB
 1839  012062  012737  000001  002266         MOV     #1,BCF                  ;SET BCF TO DENOTE HIGH BYTES
 1840  012070  122737  177777  173775         CMPB    #-1,@#173775            ;DOES THE ROM EXIST?
 1841  012076  001007                         BNE     3$                      ;BR IF YES
 1842  012100                                 ERRDF   32,,DERR3               ;HIGH BYTE DIAGNOSTIC ROM NOT FOUND
  (4)  012100  104455                         TRAP    C$ERDF
  (5)  012102  000040                         .WORD   32
  (5)  012104  000000                         .WORD   0
  (5)  012106  013002                         .WORD   DERR3
 1843  012110                                 CKLOOP                          ;LOOP ON ERROR IF SELECTED
  (3)  012110  104406                         TRAP    C$CLP1
 1844  012112                                 EXIT    TST                     ;EXIT TEST, ROM NOT FOUND
  (3)  012112  104432                         TRAP    C$EXIT
  (3)  012114  002200                         .WORD   L10063-.
 1845  012116                         3$:     CKLOOP                          ;CHECK FOR LOOP ON ERROR
  (3)  012116  104406                         TRAP    C$CLP1
 1846  012120  004737  004302                 JSR     PC,CHKSUM               ;COMPUTE THE ACTUAL CHECKSUM
 1847  012124  113737  173777  002302         MOVB    @#173777,EXPSUM         ;GET EXPECTED CHECKSUM
 1848  012132  063737  002304  002302         ADD     ACTSUM,EXPSUM           ;ADD THE EXPECTED AND ACTUAL CHECKSUMS
 1849  012140  105737  002302                 TSTB    EXPSUM                  ;BYTE RESULT = 0?
 1850  012144  001404                         BEQ     4$                      ;BR IF YES
 1851  012146                                 ERRDF   33,,DERR4               ;CHECKSUM ERROR IN DIAGNOSTIC ROM
  (4)  012146  104455                         TRAP    C$ERDF
  (5)  012150  000041                         .WORD   33
  (5)  012152  000000                         .WORD   0
  (5)  012154  013030                         .WORD   DERR4
 1852  012156                         4$:     CKLOOP
  (3)  012156  104406                         TRAP    C$CLP1
 1853  012160                                 ENDSUB
  (3)  012160                         L10065:
  (3)  012160  104403                         TRAP    C$ESUB
 1854
 1855  012162                                 BGNSUB
  (3)  012162  104402                         TRAP    C$BSUB
 1856  012164  062737  001002  002264         ADD     #1002,VRTPCR            ;NEXT PAGE IN PCR
 1857  012172  013737  002264  177520         MOV     VRTPCR,PCR
 1858  012200  005337  002274                 DEC     COUNTR                  ;DECREMENT CHECKWORD COUNT
 1859  012204  001266                         BNE     DLOOP                   ;LOOP UNTIL ALL 20 PAGES HAVE BEEN CHECKED
 1860  012206                                 ENDSUB
  (3)  012206                         L10066:
  (3)  012206  104403                         TRAP    C$ESUB
```

```
 1861
 1862
 1863                                          ;GET THE CHECKWORDS FROM THE ROMS AND PUT INTO TABLE 'CHKWRD'
 1864  012210                                  BGNSUB
  (3)  012210  104402                         TRAP    C$BSUB
 1865  012212  012702  013104                 MOV     #CHKWRD,R2
 1866  012216  012737  000001  002264         MOV     #1,VRTPCR
 1867  012224  005737  002260                 TST     @#LCP                   ;ARE WE TESTING A MICRO PDP-11 ?
 1868  012230  001404                         BEQ     10$                     ;NO THEN WE HAVE 8 CHECKWORDS
 1869  012232  012737  000040  002274         MOV     #40,COUNTR              ;YES,WE HAVE 32 CHECKWORDS
 1870  012240  000403                         BR      5$                      ;SKIP NEXT INSTRUCTION
 1871  012242  012737  000010  002274  10$:    MOV     #10,COUNTR
 1872  012250  013737  002264  177520  5$:     MOV     VRTPCR,PCR
 1873  012256  013722  173376                 MOV     @#173376,(R2)+
 1874  012262  062737  000002  002264         ADD     #2,VRTPCR
 1875  012270  005337  002274                 DEC     COUNTR
 1876  012274  001365                         BNE     5$
 1877  012276                                  ENDSUB
  (3)  012276                          L10067:
  (3)  012276  104403                         TRAP    C$ESUB
 1878
 1879
 1880                                          ;TRY TO IDENTIFY THE ROM CHIPS
 1881  012300                                  BGNSUB
  (3)  012300  104402                         TRAP    C$BSUB
 1882  012302  005737  002260                 TST     @#LCP                   ;ARE WE TESTING A MICRO PDP-11 ?
 1883  012306  001424                         BEQ     5$                      ;NO THEN GO TRY TO IDENTIFY ROM CHIPS
 1884  012310  012737  020440  177520         MOV     #20440,@#PCR            ;YES,THEN ACCESS THE CORRECT PAGE
 1885  012316  012700  173004                 MOV     #173004,R0              ;. GET POINTER TO THE MESSAGE
 1886  012322  012701  013214                 MOV     #LCPTBL+4,R1            ;. GET POINTER TO THE TABLE
 1887  012326  005710                  1$:    TST     (R0)                    ;. ARE WE DONE GETTING MESSAGE YET ?
 1888  012330  001402                         BEQ     2$                      ;. YES,THEN GO PRINT IT OUT
 1889  012332  112021                         MOVB    (R0)+,(R1)+             ;. FILL UP THE TABLE
 1890  012334  000774                         BR      1$                      ;. SEE IF WE ARE THRU THE TABLE
 1891  012336                           2$:    PRINTF  #LCPTBL                 ;. PRINT OUT THE ROM REVISION
  (7)  012336  012746  013210                 MOV     #LCPTBL,-(SP)
  (6)  012342  012746  000001                 MOV     #1,-(SP)
  (3)  012346  010600                         MOV     SP,R0
  (4)  012350  104417                         TRAP    C$PNTF
  (4)  012352  062706  000004                 ADD     #4,SP
 1892  012356  000557                         BR      11$                     ;. EXIT THE SUBTEST
 1893  012360  013701  013204          5$:    MOV     TABLES,R1
 1894  012364  012737  002200  013206         MOV     #SFPTBL+20,PNTR
 1895  012372  020127  000001          6$:    CMP     R1,#1                   ;CHECK IF IS THE LAST TABLE
 1896  012376  001455                         BEQ     11$                     ;YES, GO CKECK WITH OPERATOR'S INPUT
 1897  012400  013700  013206                 MOV     PNTR,R0
 1898  012404  012702  013104                 MOV     #CHKWRD,R2
 1899  012410  012737  000010  002274         MOV     #10,COUNTR
 1900  012416  022022                  7$:    CMP     (R0)+,(R2)+             ;ARE THE CHECKWORDS EQUAL?
 1901  012420  001071                         BNE     9$                      ;BRANCH IF NOT
 1902  012422  005337  002274                 DEC     COUNTR                  ;DONE CHECKING THIS TABLE?
 1903  012426  001373                         BNE     7$                      ;BRANCH IF NOT
 1904  012430  020127  000004                 CMP     R1,#4           ;DID THE FIRST TABLE OF CHECKWORDS COMPARE?
 1905  012434  001011                         BNE     8$              ;BRANCH IF NOT
 1906  012436                                  PRINTF  #TABL1                  ;PRINT OUT ROM CHIP NUMBERS
  (7)  012436  012746  013604                 MOV     #TABL1,-(SP)
```

```
   (6)  012442  012746  000001                    MOV     #1,-(SP)
   (3)  012446  010600                            MOV     SP,R0
   (4)  012450  104417                            TRAP    C$PNTF
   (4)  012452  062706  000004                    ADD     #4,SP
 1907   012456  000517                            BR      11$
 1908   012460  020127  000003            8$:     CMP     R1,#3           ;DID THE SECOND TABLE OF CHECKWORDS COMPARE?
 1909   012464  001011                            BNE     20$             ;BRANCH IF NOT
 1910   012466                                    PRINTF  #TABL2                  ;PRINT OUT ROM CHIP NUMBERS
   (7)  012466  012746  013703                    MOV     #TABL2,-(SP)
   (6)  012472  012746  000001                    MOV     #1,-(SP)
   (3)  012476  010600                            MOV     SP,R0
   (4)  012500  104417                            TRAP    C$PNTF
   (4)  012502  062706  000004                    ADD     #4,SP
 1911   012506  000503                            BR      11$
 1912   012510                            20$:    PRINTF  #TABL3
   (7)  012510  012746  014002                    MOV     #TABL3,-(SP)
   (6)  012514  012746  000001                    MOV     #1,-(SP)
   (3)  012520  010600                            MOV     SP,R0
   (4)  012522  104417                            TRAP    C$PNTF
   (4)  012524  062706  000004                    ADD     #4,SP
 1913   012530  000472                            BR      11$
 1914   012532  012700  002160            119$:   MOV     #SFPTBL,R0      ;PREPARE TO CHECK INPUT TABLE
 1915   012536  012702  013104                    MOV     #CHKWRD,R2      ;STORE ADDRESS OF INPUT TABLE
 1916   012542  012737  000010  002274    50$:    MOV     #10,COUNTR      ;DO FOR 8 CHECKWORDS
 1917   012550  022022                    121$:   CMP     (R0)+,(R2)+     ;COMPARE INPUT AND FOUND CHWS
 1918   012552  001014                            BNE     9$              ;IF NOT, BRANCH
 1919   012554  005337  002274                    DEC     COUNTR          ;ALL DONE?
 1920   012560  001373                            BNE     121$            ;IF NOT, BRANCH TO CONTINUE
 1921   012562                                    PRINTF  #OPTBL          ;PRINT MSG TO INDICATE IT'S OPERATOR'S CHKWRD
   (7)  012562  012746  013524                    MOV     #OPTBL,-(SP)
   (6)  012566  012746  000001                    MOV     #1,-(SP)
   (3)  012572  010600                            MOV     SP,R0
   (4)  012574  104417                            TRAP    C$PNTF
   (4)  012576  062706  000004                    ADD     #4,SP
 1922   012602  000445                            BR      11$             ;IF DONE, BRANCH TO EXIT
 1923   012604  062737  000020  013206    9$:     ADD     #20,PNTR
 1924   012612  005301                            DEC     R1                      ;ANY MORE TABLES TO CHECK?
 1925   012614  001266                            BNE     6$                      ;BRANCH IF YES
 1926   012616                                    MANUAL                  ;APT MODE?
   (3)  012616  104450                            TRAP    C$MANI
 1927   012620                                    BCOMPLETE       100$            ;PRINT UNKNOWN
   (2)  012620  103405                            BCS     100$
 1928   012622                                    ERRDF   34.,DERR5               ;CHECKWORD ERROR
   (4)  012622  104455                            TRAP    C$ERDF
   (5)  012624  000042                            .WORD   34
   (5)  012626  000000                            .WORD   0
   (5)  012630  013056                            .WORD   DERR5
 1929   012632                                    CKLOOP                  ;ROMS DO NOT MATCH
   (3)  012632  104406                            TRAP    C$CLP1
 1930   012634                            100$:   PRINTF  #UNKNWN         ;PRINT OUT UNIDENTIFIED ROM CHIPS CHECKWORDS
   (7)  012634  012746  014101                    MOV     #UNKNWN,-(SP)
   (6)  012640  012746  000001                    MOV     #1,-(SP)
   (3)  012644  010600                            MOV     SP,R0
   (4)  012646  104417                            TRAP    C$PNTF
   (4)  012650  062706  000004                    ADD     #4,SP
 1931   012654  012737  000010  002274    60$:    MOV     #10,COUNTR
```

```
 1932  012662  012701  013104          61$:    MOV     #CHKWRD,R1
 1933  012666                          10$:    PRINTF  #CHECKW,(R1)+
  (8)  012666  012146                          MOV     (R1)+,-(SP)
  (7)  012670  012746  014165                  MOV     #CHECKW,-(SP)
  (6)  012674  012746  000002                  MOV     #2,-(SP)
  (3)  012700  010600                          MOV     SP,R0
  (4)  012702  104417                          TRAP    C$PNTF
  (4)  012704  062706  000006                  ADD     #6,SP
 1934  012710  005337  002274                  DEC     COUNTR
 1935  012714  001364                          BNE     10$
 1936  012716                          11$:    ENDSUB
  (3)  012716                          L10070:
  (3)  012716  104403                          TRAP    C$ESUB
 1937
 1938
 1939
 1940  012720                                  EXIT    TST
  (3)  012720  104432                          TRAP    C$EXIT
  (3)  012722  001372                          .WORD   L10063-.
 1941
 1942  012724  000000                  DRLP:   .WORD   0
 1943
 1944  012726                          BGNMSG  DERR1
  (3)  012726                          DERR1::
 1945  012726                          PRINTB  #LRAERR,#NODR
  (8)  012726  012746  014246                  MOV     #NODR,-(SP)
  (7)  012732  012746  013266                  MOV     #LRAERR,-(SP)
  (6)  012736  012746  000002                  MOV     #2,-(SP)
  (3)  012742  010600                          MOV     SP,R0
  (4)  012744  104414                          TRAP    C$PNTB
  (4)  012746  062706  000006                  ADD     #6,SP
 1946  012752                          ENDMSG
  (3)  012752                          L10071:
  (3)  012752  104423                          TRAP    C$MSG
 1947
 1948  012754                          BGNMSG  DERR2
  (3)  012754                          DERR2::
 1949  012754                          PRINTB  #LOWROM,#CKERR
  (8)  012754  012746  002724                  MOV     #CKERR,-(SP)
  (7)  012760  012746  013344                  MOV     #LOWROM,-(SP)
  (6)  012764  012746  000002                  MOV     #2,-(SP)
  (3)  012770  010600                          MOV     SP,R0
  (4)  012772  104414                          TRAP    C$PNTB
  (4)  012774  062706  000006                  ADD     #6,SP
 1950  013000                          ENDMSG
  (3)  013000                          L10072:
  (3)  013000  104423                          TRAP    C$MSG
 1951
 1952  013002                          BGNMSG  DERR3
  (3)  013002                          DERR3::
 1953  013002                          PRINTB  #HRAERR,#NODR
  (8)  013002  012746  014246                  MOV     #NODR,-(SP)
  (7)  013006  012746  013404                  MOV     #HRAERR,-(SP)
  (6)  013012  012746  000002                  MOV     #2,-(SP)
  (3)  013016  010600                          MOV     SP,R0
  (4)  013020  104414                          TRAP    C$PNTB
```

```
   (4)  013022  062706  000006                    ADD     #6,SP
 1954   013026                          ENDMSG
   (3)  013026                          L10073:
   (3)  013026  104423                            TRAP    C$MSG
 1955
 1956   013030                          BGNMSG  DERR4
   (3)  013030                          DERR4::
 1957   013030                          PRINTB  #HIROM,#CKERR
   (8)  013030  012746  002724                    MOV     #CKERR,-(SP)
   (7)  013034  012746  013463                    MOV     #HIROM,-(SP)
   (6)  013040  012746  000002                    MOV     #2,-(SP)
   (3)  013044  010600                            MOV     SP,R0
   (4)  013046  104414                            TRAP    C$PNTB
   (4)  013050  062706  000006                    ADD     #6,SP
 1958   013054                          ENDMSG
   (3)  013054                          L10074:
   (3)  013054  104423                            TRAP    C$MSG
 1959
 1960   013056                          BGNMSG  DERR5
   (3)  013056                          DERR5::
 1961   013056                          PRINTB  #MISTAK
   (7)  013056  012746  014174                    MOV     #MISTAK,-(SP)
   (6)  013062  012746  000001                    MOV     #1,-(SP)
   (3)  013066  010600                            MOV     SP,R0
   (4)  013070  104414                            TRAP    C$PNTB
   (4)  013072  062706  000004                    ADD     #4,SP
 1962   013076  004737  004526          JSR     PC,VIRTAD
 1963   013102                          ENDMSG
   (3)  013102                          L10075:
   (3)  013102  104423                            TRAP    C$MSG
 1964
 1965                                   .EVEN
 1966   013104  000040                  CHKWRD: .BLKW   40              ;TABLE TO STORE THE CHECKWORDS
 1967
 1968   013204  000004                  TABLES: .WORD   4               ;NUMBER OF CHECKWORD TABLES
 1969   013206  000000                  PNTR:   .WORD   0               ;WILL BE USED AS A POINTER
 1970
 1971                                   ;
 1972                                   ; LCPTBL WILL GET FILLED WITH THE ASCIZ DATA THAT TELLS THE MICRO PDP-11 ROM REVISION
 1973                                   ;
 1974
 1975   013210  040445  020040  020040  LCPTBL: .ASCIZ  /%A                                                    %N/
        013216  020040  020040  020040
        013224  020040  020040  020040
        013232  020040  020040  020040
        013240  020040  020040  020040
        013246  020040  020040  020040
        013254  020040  020040  020040
        013262  022440  000116
 1976
 1977   013266  052045  047045  040445  LRAERR: .ASCIZ  /%T%N%ACANNOT ACCESS LOW BYTE DIAGNOSTIC ROM%N/
        013274  040503  047116  052117
        013302  040440  041503  051505
        013310  020123  047514  020127
        013316  054502  042524  042040
        013324  040511  047107  051517
```

```
                013332  044524  020103  047522
                013340  022515  000116
      1978
      1979      013344  052045  047045  040445  LOWROM: .ASCIZ  /%T%N%ALOW BYTE DIAGNOSTIC ROM%N/
                013352  047514  020127  054502
                013360  042524  042040  040511
                013366  047107  051517  044524
                013374  020103  047522  022515
                013402  000116
      1980
      1981      013404  052045  047045  040445  HRAERR: .ASCIZ  /%T%N%ACANNOT ACCESS HIGH BYTE DIAGNOSTIC ROM%N/
                013412  040503  047116  052117
                013420  040440  041503  051505
                013426  020123  044510  044107
                013434  041040  052131  020105
                013442  044504  043501  047516
                013450  052123  041511  051040
                013456  046517  047045     000
      1982
      1983      013463     045  022524  022516  HIROM:  .ASCIZ  ,%T%N%AHIGH BYTE DIAGNOSTIC ROM%N/
                013470  044101  043511  020110
                013476  054502  042524  042040
                013504  040511  047107  051517
                013512  044524  020103  047522
                013520  022515  000116
      1984
      1985      013524  047045  040445  044103  OPTBL:  .ASCIZ  /%N%ACHECKWORDS CORRESPOND TO OPERATOR'S INPUT%N/
                013532  041505  053513  051117
                013540  051504  041440  051117
                013546  042522  050123  047117
                013554  020104  047524  047440
                013562  042520  040522  047524
                013570  023522  020123  047111
                013576  052520  022524  000116
      1986
      1987      013604  047045  040445  044103  TABL1:  .ASCIZ  /%N%ACHECKWORDS CORRESPOND TO ROM CHIPS #23-045E2 & #23-046E2%N/
                013612  041505  053513  051117
                013620  051504  041440  051117
                013626  042522  050123  047117
                013634  020104  047524  051040
                013642  046517  041440  044510
                013650  051520  021440  031462
                013656  030055  032464  031105
                013664  023040  021440  031462
                013672  030055  033064  031105
                013700  047045     000
      1988
      1989      013703     045  022516  041501  TABL2:  .ASCIZ  /%N%ACHECKWORDS CORRESPOND TO ROM CHIPS #23-010E2 & #23-011E2%N/
                013710  042510  045503  047527
                013716  042122  020123  047503
                013724  051122  051505  047520
                013732  042116  052040  020117
                013740  047522  020115  044103
                013746  050111  020123  031043
                013754  026463  030460  042460
                013762  020062  020046  031043
```

```
        013770  026463  030460  042461
        013776  022462  000116
 1990
 1991   014002  047045  040445  044103  TABL3:  .ASCIZ  /%N%ACHECKWORDS CORRESPOND TO ROM CHIPS #23-339E2 & #23-340E2%N/
        014010  041505  053513  051117
        014016  051504  041440  051117
        014024  042522  050123  047117
        014032  020104  047524  051040
        014040  046517  041440  044510
        014046  051520  021440  031462
        014054  031455  034463  031105
        014062  023040  021440  031462
        014070  031455  030064  031105
        014076  047045     000
 1992
 1993   014101     045  022516  052501  UNKNWN: .ASCIZ  /%N%AUNKNOWN ROM CHIPS FOUND.  THEIR CHECKWORDS ARE:/
        014106  045516  047516  047127
        014114  051040  046517  041440
        014122  044510  051520  043040
        014130  052517  042116  020056
        014136  052040  042510  051111
        014144  041440  042510  045503
        014152  047527  042122  020123
        014160  051101  035105     000
 1994
 1995   014165     045  022516  030517  CHECKW: .ASCIZ  /%N%012/
        014172  000062
 1996
 1997   014174  040445  047111  047503  MISTAK: .ASCIZ  /%AINCORRECT CHECKWORD IN DIAGNOSTIC ROM%N/
        014202  051122  041505  020124
        014210  044103  041505  053513
        014216  051117  020104  047111
        014224  042040  040511  047107
        014232  051517  044524  020103
        014240  047522  022515  000116
 1998
 1999   014246  047516  026516  054105  NODR:   .ASCIZ  /NON-EXISTENT MEMORY/
        014254  051511  042524  052116
        014262  046440  046505  051117
        014270  000131
 2000
 2001   014272  052123  047101  040504  DADDR:  .ASCIZ  /STANDARD JUMPERS/
        014300  042122  045040  046525
        014306  042520  051522     000
 2002
 2003           014314                          .EVEN
 2004   014314                                  ENDTST
  (3)   014314                          L10063:
  (3)   014314  104401                          TRAP    C$ETST
 2005                                   .SBTTL  TEST 7: TEST ALL ADDITIONAL MEMORY
 2006                                   ;++
 2007                                   ;TEST TO LOCATE AND VERIFY CHECKSUMS IN ALL RESIDENT MEMORY
 2008                                   ;ON A PAGE BASIS. THERE ARE FOUR STORAGE AREAS ASSOCIATED
 2009                                   ;WITH THIS TEST WHICH HOLD THE CHECKWORDS OF ALL THE MEMORY
 2010                                   ;THAT IS TO BE TESTED. THESE TABLES WILL HAVE DEFAULT VALUES
 2011                                   ;ONLY IF THE ASSOCIATED MEMORY CHIP IS A STANDARD COMPONENT
```

```
 2012                                   ;ON THE BOARD. IF NO DEFAULT VALUES EXIST, THE OPERATOR MUST
 2013                                   ;INPUT THE CHECKWORDS AS LISTED ON THE PRINT SET. THE MEMORY
 2014                                   ;WILL BE TESTED IN THE FOLLOWING LOCATIONS BY DEFAULT:
 2015                                   ;
 2016                                   ;       EXPANDABLE DIAGNOSTIC ROM       2-4K
 2017                                   ;       EPROM IN SOCKETS                4-6K
 2018                                   ;       SYSTEM ROM                      16-32K
 2019                                   ;       SYSTEM EPROM                    16-24K
 2020                                   ;
 2021                                   ;THE TEST WILL FIRST VERIFY THE CHECKSUMS IN ALL RESIDENT ROM,
 2022                                   ;THEN COMPARE THE ACTUAL CHECKWORDS. ERROR INFORMATION WILL
 2023                                   ;INCLUDE THE SPECIFIC TYPE OF ERROR THAT OCCURRS, THE VIRTUAL
 2024                                   ;ADDRESS, AND WHETHER IT WAS THE HIGH BYTE OR LOW BYTE ROM/EPROM.
 2025                                   ;THIS INFORMATION SHOULD ALLOW A KNOWLEDGEABLE OPERATOR TO ISOLATE
 2026                                   ;THE ERROR DOWN TO A SINGLE ROM/EPROM WITH THE AID OF THE
 2027                                   ;ADDRESS MAP IN THE PRINT SET.
 2028                                   ;--
 2029  014316                           BGNTST
 2030
 2031  014316                           BGNSUB
  (3)  014316  104402                   TRAP    C$BSUB
 2032  014320  005737  002262           TST     KDF11B                  ;IF THIS IS A KDF11-B...
 2033  014324  001402                   BEQ     1$
 2034  014326                           EXIT    TST                     ;...THEN SKIP THIS TEST
  (3)  014326  104432                   TRAP    C$EXIT
  (3)  014330  002702                   .WORD   L10076-.
 2035  014332                   1$:     MANUAL                          ;UNDER APT?
  (3)  014332  104450                   TRAP    C$MANI
 2036  014334                           BNCOMPLETE      DFLTST          ;SKIP TEST IF YES
  (2)  014334  103112                   BCC     DFLTST
 2037  014336  005037  016412           CLR     ADDON                   ;RESTORE DEFAULT
 2038  014342  005737  002306           TST     PASS                    ;FIRST PASS?
 2039  014346  001422                   BEQ     GET                     ;BR IF YES
 2040  014350  005737  016416           TST     LOD1                    ;EXPANDED DIAGNOSTIC ROM?
 2041  014354  001153                   BNE     LD1                     ;BR IF YES
 2042  014356  005737  016420           TST     LOD2                    ;EPROM IN SOCKETS?
 2043  014362  001402                   BEQ     P1                      ;BR IF NO
 2044  014364  000137  015260           JMP     LD2                     ;TEST EPROM
 2045  014370  005737  016422   P1:     TST     LOD3                    ;SYSTEM ROM ?
 2046  014374  001402                   BEQ     P2                      ;BR IF NO
 2047  014376  000137  015634           JMP     LD3                     ;TEST ROM
 2048  014402  005737  016424   P2:     TST     LOD4                    ;SYSTEM EPROM?
 2049  014406  001465                   BEQ     DFLTST                  ;EXIT IF NO
 2050  014410  000137  016200           JMP     LD4                     ;TEST EPROM
 2051  014414                   GET:    GMANIL  EXEC,ADDON,1,YES
  (3)  014414  104443                   TRAP    C$GMAN
  (3)  014416  000404                   BR      10000$
  (4)  014420  016412                   .WORD   ADDON
  (5)  014422  000130                   .WORD   T$CODE
  (5)  014424  016753                   .WORD   EXEC
  (5)  014426  000001                   .WORD   1
  (3)  014430                   10000$:
 2052  014430  005737  016412           TST     ADDON                   ;ADDITIONAL MEMORY?
 2053  014434  001452                   BEQ     DFLTST                  ;BR IF NO
 2054  014436                   DIAIN:  GMANIL  EXPND,RESPND,1,NO
  (3)  014436  104443                   TRAP    C$GMAN
```

```
   (3)  014440  000404                        BR      10001$
   (4)  014442  002334                        .WORD   RESPND
   (5)  014444  000120                        .WORD   T$CODE
   (5)  014446  017002                        .WORD   EXPND
   (5)  014450  000001                        .WORD   1
   (3)  014452                          10001$:
  2055  014452  005737  002334                TST     RESPND                  ;EXPANDED DIAGNOSTIC ROM?
  2056  014456  001045                        BNE     EXPROM                  ;BR IF YES
  2057  014460                        EPRIN:  GMANIL  EPRM,RESPND,1,NO
   (3)  014460  104443                        TRAP    C$GMAN
   (3)  014462  000404                        BR      10002$
   (4)  014464  002334                        .WORD   RESPND
   (5)  014466  000120                        .WORD   T$CODE
   (5)  014470  017032                        .WORD   EPRM
   (5)  014472  000001                        .WORD   1
   (3)  014474                          10002$:
  2058  014474  005737  002334                TST     RESPND                  ;EPROM IN SOCKETS?
  2059  014500  001402                        BEQ     SYSRIN                  ;BR IF NO
  2060  014502  000137  015126                JMP     EPRMT                   ;JUMP TO ACCEPT INPUT
  2061  014506                        SYSRIN: GMANIL  SYSR,RESPND,1,NO
   (3)  014506  104443                        TRAP    C$GMAN
   (3)  014510  000404                        BR      10003$
   (4)  014512  002334                        .WORD   RESPND
   (5)  014514  000120                        .WORD   T$CODE
   (5)  014516  017053                        .WORD   SYSR
   (5)  014520  000001                        .WORD   1
   (3)  014522                          10003$:
  2062  014522  005737  002334                TST     RESPND                  ;SYSTEM ROM?
  2063  014526  001402                        BEQ     SYSEIN                  ;BR IF NO
  2064  014530  000137  015474                JMP     SYSRT                   ;INPUT CHECKWORDS
  2065  014534                        SYSEIN: GMANIL  SYSE,RESPND,1,NO
   (3)  014534  104443                        TRAP    C$GMAN
   (3)  014536  000404                        BR      10004$
   (4)  014540  002334                        .WORD   RESPND
   (5)  014542  000120                        .WORD   T$CODE
   (5)  014544  017066                        .WORD   SYSE
   (5)  014546  000001                        .WORD   1
   (3)  014550                          10004$:
  2066  014550  005737  002334                TST     RESPND                  ;SYSTEM EPROM?
  2067  014554  001402                        BEQ     DFLTST                  ;BR IF NO
  2068  014556  000137  016040                JMP     SYSET                   ;INPUT CHECKWORDS
  2069  014562                        DFLTST: EXIT    TST                     ;NO ADDTL. MEMORY -- EXIT
   (3)  014562  104432                        TRAP    C$EXIT
   (3)  014564  002446                        .WORD   L10076-.
  2070  014566                                ENDSUB
   (3)  014566                          L10077:
   (3)  014566  104403                        TRAP    C$ESUB
  2071
  2072
  2073  014570                                BGNSUB
   (3)  014570  104402                        TRAP    C$BSUB
  2074  014572  005037  002346        EXPROM: CLR     ERRFLG                  ;CLEAR ERROR FLAG
  2075  014576  012737  000010  002324        MOV     #10,WORDCT              ;COUNT 8 CHECKWORDS
  2076  014604  012702  002352                MOV     #EXPDIA,R2              ;POINTER TO STORAGE TABLE
  2077  014610  004737  004346                JSR     PC,INPUT                ;INPUT CHECKWORDS
  2078  014614                                GMANIL  EXADD,ANSR,1,YES
```

```
   (3)  014614  104443                        TRAP    C$GMAN
   (3)  014616  000404                        BR      10000$
   (4)  014620  002276                        .WORD   ANSR
   (5)  014622  000130                        .WORD   T$CODE
   (5)  014624  017103                        .WORD   E^ADD
   (5)  014626  000001                        .WORD   1
   (3)  014630                          10000$:
 2079   014630  005737  002276                TST     ANSR                    ;STANDARD MEMORY RANGE?
 2080   014634  001020                        BNE     1$                      ;BR IF YES
 2081   014636  005237  002276                INC     ANSR                    ;RESTORE DEFAULT VALUE
 2082   014642                                GMANID  LOADR,STORE,D,-1,0,30,NO
   (3)  014642  104443                        TRAP    C$GMAN
   (3)  014644  000406                        BR      10001$
   (4)  014646  002322                        .WORD   STORE
   (5)  014650  000042                        .WORD   T$CODE
   (5)  014652  003074                        .WORD   LOADR
   (5)  014654  177777                        .WORD   -1
   (5)  014656  000000                        .WORD   T$LOLIM
   (5)  014660  000030                        .WORD   T$HILIM
   (3)  014662                          10001$:
 2083   014662  004737  005144                JSR     PC,SETADR               ;GET FIRST PAGE ADDRESS
 2084   014666  013737  002272  016416        MOV     LOPAG,LOD1              ;STORE LOW PAGE NO.
 2085   014674  000403                        BR      LD1                     ;SKIP NEXT INSTRUCTION
 2086   014676  012737  010420  016416  1$:   MOV     #010420,LOD1            ;STANDARD PAGE = 20,21  2-4K RANGE
 2087   014704  013737  016416  177520  LD1:  MOV     LOD1,PCR                ;LOAD STARTING PAGE
 2088   014712  012737  000001  002300        MOV     #1,RFLAG                ;INDICATE ROM
 2089   014720  012703  002352                MOV     #EXPDIA,R3              ;POINTER TO CHECKWORDS
 2090   014724  012737  000010  002274        MOV     #10,COUNTR              ;PAGE COUNT
 2091   014732  012337  002330          EXPTST: MOV     (R3)+,CKWD              ;GET CHECKWORD FOR THIS PAGE
 2092   014736  004737  004666                JSR     PC,MEMTST               ;TEST MEMORY
 2093   014742  005737  002270                TST     REAL                    ;DOES THE MEMORY EXIST?
 2094   014746  001457                        BEQ     E3                      ;BR IF NO
 2095   014750  005737  002346                TST     ERRFLG                  ;ANY OTHER ERRORS?
 2096   014754  001421                        BEQ     NOERR                   ;BR IF NO
 2097   014756  004737  004526                JSR     PC,VIRTAD               ;GET ADDRESS OF ERROR
 2098   014762  005737  002266                TST     BCF                     ;LOW BYTE PAGE?
 2099   014766  001004                        BNE     HIGH                    ;BR IF NO
 2100   014770  012737  002767  002344        MOV     #LOBYT,BYTLOC           ;SET POINTER FOR ERROR MSG.
 2101   014776  000403                        BR      DATOUT                  ;PRINT ERROR MESSAGE
 2102   015000  012737  003031  002344  HIGH: MOV     #HIBYT,BYTLOC           ;POINTER FOR ERROR MSG.
 2103   015006  022737  000001  002346  DATOUT: CMP    #1,ERRFLG               ;CHECKSUM ERROR?
 2104   015014  001420                        BEQ     E1                      ;BR IF YES
 2105   015016  000425                        BR      E2                      ;ELSE CHECKWORD ERROR
 2106   015020  062737  001002  177520  NOERR: ADD     #1002,PCR               ;ADJUST PCR
 2107   015026  005337  002274                DEC     COUNTR                  ;DEC PAGE COUNT
 2108   015032  001337                        BNE     EXPTST                  ;LOOP UNTIL ALL PAGES ARE TESTED
 2109   015034  005737  002306          MORE: TST     PASS                    ;FIRST PASS?
 2110   015040  001002                        BNE     1$                      ;BR IF NO
 2111   015042  000137  014460                JMP     EPRIM                   ;TEST ANY ADDITIONAL MEMORY
 2112   015046  000137  014370          1$:   JMP     P1                      ;FIND ANY ADDITIONAL MEMORY
 2113   015052                                EXIT    SUB                     ;END OF SUBTEST
   (3)  015052  104432                        TRAP    C$EXIT
   (3)  015054  000046                        .WORD   L10100-.
 2114   015056                          E1:   ERRDF   35,EXPND,CKSME
   (4)  015056  104455                        TRAP    C$ERDF
   (5)  015060  000043                        .WORD   35
```

```
  (5)  015062  017002                        .WORD   EXPND
  (5)  015064  016430                        .WORD   CKSME
 2115  015066                                CKLOOP
  (3)  015066  104406                        TRAP    C$CLP1
 2116  015070  000761                        BR      MORE
 2117  015072                          E2:   ERRDF   36,EXPND,CWKDE
  (4)  015072  104455                        TRAP    C$ERDF
  (5)  015074  000044                        .WORD   36
  (5)  015076  017002                        .WORD   EXPND
  (5)  015100  016466                        .WORD   CWKDE
 2118  015102                                CKLOOP
  (3)  015102  104406                        TRAP    C$CLP1
 2119  015104  000753                        BR      MORE
 2120  015106                          E3:   ERRDF   37,EXPND,NONXT
  (4)  015106  104455                        TRAP    C$ERDF
  (5)  015110  000045                        .WORD   37
  (5)  015112  017002                        .WORD   EXPND
  (5)  015114  016550                        .WORD   NONXT
 2121  015116                                CKLOOP
  (3)  015116  104406                        TRAP    C$CLP1
 2122  015120  000745                        BR      MORE
 2123  015122                                ENDSUB
  (3)  015122                          L10100:
  (3)  015122  104403                        TRAP    C$ESUB
 2124
 2125  015124                                BGNSUB
  (3)  015124  104402                        TRAP    C$BSUB
 2126  015126  005037  002346          EPRMT: CLR     ERRFLG                  ;CLEAR ERROR FLAG
 2127  015132                                GMANID  RWDCT,WORD,D,-1,1,10,NO
  (3)  015132  104443                        TRAP    C$GMAN
  (3)  015134  000406                        BR      10000$
  (4)  015136  016426                        .WORD   WORD
  (5)  015140  000042                        .WORD   T$CODE
  (5)  015142  016711                        .WORD   RWDCT
  (5)  015144  177777                        .WORD   -1
  (5)  015146  000001                        .WORD   T$LOLIM
  (5)  015150  000010                        .WORD   T$HILIM
  (3)  015152                          10000$:
 2128  015152  013737  016426  002324        MOV     WORD,WORDCT             ;STORE CHECKWORD COUNT
 2129  015160  012702  002372                MOV     #EPROM,R2               ;POINTER TO STORAGE TABLE
 2130  015164  004737  004346                JSR     PC,INPUT                ;INPUT CHECKWORDS
 2131  015170                                GMANIL  EPADD,ANSR,1,YES
  (3)  015170  104443                        TRAP    C$GMAN
  (3)  015172  000404                        BR      10001$
  (4)  015174  002276                        .WORD   ANSR
  (5)  015176  000130                        .WORD   T$CODE
  (5)  015200  017131                        .WORD   EPADD
  (5)  015202  000001                        .WORD   1
  (3)  015204                          10001$:
 2132  015204  005737  002276                TST     ANSR                    ;STANDARD MEMORY RANGE?
 2133  015210  001020                        BNE     1$                      ;BR IF YES
 2134  015212  005237  002276                INC     ANSR                    ;RESTORE DEFAULT
 2135  015216                                GMANID  LOADR,STORE,D,-1,0,30,NO
  (3)  015216  104443                        TRAP    C$GMAN
  (3)  015220  000406                        BR      10002$
  (4)  015222  002322                        .WORD   STORE
```

```
   (5)  015224  000042                          .WORD   T$CODE
   (5)  015226  003074                          .WORD   LOADR
   (5)  015230  177777                          .WORD   -1
   (5)  015232  000000                          .WORD   T$LOLIM
   (5)  015234  000030                          .WORD   T$HILIM
   (3)  015236                          10002$:
2136    015236  004737  005144                  JSR     PC,SETADR       ;GET FIRST PAGE ADDRESS
2137    015242  013737  002272  016420          MOV     LOPAG,LOD2      ;STORE LOW PAGE NO.
2138    015250  000403                          BR      LD2             ;SKIP NEXT INSTRUCTION
2139    015252  012737  020440  016420  1$:     MOV     #020440,LOD2    ;STANDARD PAGE = 40,41  4-6K RANGE
2140    015260  013737  016420  177520  LD2:    MOV     LOD2,PCR        ;LOAD STARTING ADDRESS
2141    015266  013737  016426  002274          MOV     WORD,COUNTR     ;PAGE COUNT
2142    015274  005037  002300                  CLR     RFLAG           ;INDICATE EPROM
2143    015300  012703  002372                  MOV     #EPROM,R3       ;POINT TO CHECKWORDS
2144    015304  012337  002330          EPRTST: MOV     (R3)+,CKWD      ;GET CHECKWORD FOR THIS PAGE
2145    015310  004737  004666                  JSR     PC,MEMTST       ;TEST MEMORY
2146    015314  005737  002270                  TST     REAL            ;DOES THE MEMORY EXIST?
2147    015320  001455                          BEQ     E6              ;BR IF NO
2148    015322  005737  002346                  TST     ERRFLG          ;ANY OTHER ERRORS?
2149    015326  001421                          BEQ     NONE            ;BR IF NO
2150    015330  004737  004526                  JSR     PC,VIRTAD       ;GET ADDRESS OF ERROR
2151    015334  005737  002266                  TST     BCF             ;LOW BYTE PAGE?
2152    015340  001004                          BNE     HIADD           ;BR IF NO
2153    015342  012737  002767  002344          MOV     #LOBYT,BYTLOC   ;SET POINTER FOR ERROR MSG.
2154    015350  000403                          BR      PRIOUT          ;PRINT ERROR MESSAGE
2155    015352  012737  003031  002344  HIADD:  MOV     #HIBYT,BYTLOC   ;POINTER FOR ERROR MSG.
2156    015360  022737  000001  002346  PRIOUT: CMP     #1,ERRFLG       ;CHECKSUM ERROR?
2157    015366  001416                          BEQ     E4              ;BR IF YES
2158    015370  000423                          BR      E5              ;ELSE CHECKWORD ERROR
2159    015372  062737  001002  177520  NONE:   ADD     #1002,PCR       ;ADJUST PAGE IN PCR
2160    015400  005337  002274                  DEC     COUNTR          ;DEC PAGE COUNT
2161    015404  001337                          BNE     EPRTST          ;LOOP UNTIL FINISHED
2162    015406  005737  002306          ADDTL:  TST     PASS            ;FIRST PASS?
2163    015412  001002                          BNE     1$              ;BR IF NO
2164    015414  000137  014506                  JMP     SYSRIN          ;TEST ANY ADDITIONAL MEMORY
2165    015420  000137  014402          1$:     JMP     P2              ;FIND ANY ADDITIONAL MEMORY
2166    015424                          E4:     ERRDF   40,EPRM,CKSME
   (4)  015424  104455                          TRAP    C$ERDF
   (5)  015426  000050                          .WORD   40
   (5)  015430  017032                          .WORD   EPRM
   (5)  015432  016430                          .WORD   CKSME
2167    015434                                  CKLOOP
   (3)  015434  104406                          TRAP    C$CLP1
2168    015436  000763                          BR      ADDTL
2169    015440                          E5:     ERRDF   41,EPRM,CWKDE
   (4)  015440  104455                          TRAP    C$ERDF
   (5)  015442  000051                          .WORD   41
   (5)  015444  017032                          .WORD   EPRM
   (5)  015446  016466                          .WORD   CWKDE
2170    015450                                  CKLOOP
   (3)  015450  104406                          TRAP    C$CLP1
2171    015452  000755                          BR      ADDTL
2172    015454                          E6:     ERRDF   42,EPRM,NONXT
   (4)  015454  104455                          TRAP    C$ERDF
   (5)  015456  000052                          .WORD   42
   (5)  015460  017032                          .WORD   EPRM
```

```
  (5)  015462  016550                          .WORD   NONXT
2173   015464                                  CKLOOP
  (3)  015464  104406                          TRAP    C$CLP1
2174   015466  000747                          BR      ADDTL
2175   015470                                  ENDSUB
  (3)  015470                          L10101:
  (3)  015470  104403                          TRAP    C$ESUB
2176
2177   015472                                  BGNSUB
  (3)  015472  104402                          TRAP    C$BSUB
2178   015474  005037  002346          SYSRT:  CLR     ERRFLG                  ;CLEAR ERROR FLAG
2179   015500                                  GMANID  RWDCT,RESPND,D,-1,10,100,NO
  (3)  015500  104443                          TRAP    C$GMAN
  (3)  015502  000406                          BR      10000$
  (4)  015504  002334                          .WORD   RESPND
  (5)  015506  000042                          .WORD   T$CODE
  (5)  015510  016711                          .WORD   RWDCT
  (5)  015512  177777                          .WORD   -1
  (5)  015514  000010                          .WORD   T$LOLIM
  (5)  015516  000100                          .WORD   T$HILIM
  (3)  015520                          10000$:
2180   015520  013737  002334  016414          MOV     RESPND,PGCT             ;STORE PAGE COUNT
2181   015526  013737  002334  002324          MOV     RESPND,WORDCT           ;COPY WORD COUNT
2182   015534  012702  002412                  MOV     #SYSROM,R2              ;POINTER TO STORAGE TABLE
2183   015540  004737  004346                  JSR     PC,INPUT                ;INPUT CHECKWORDS
2184   015544                                  GMANIL  SRR,ANSR,1,YES
  (3)  015544  104443                          TRAP    C$GMAN
  (3)  015546  000404                          BR      10001$
  (4)  015550  002276                          .WORD   ANSR
  (5)  015552  000130                          .WORD   T$CODE
  (5)  015554  017150                          .WORD   SRR
  (5)  015556  000001                          .WORD   1
  (3)  015560                          10001$:
2185   015560  005737  002276                  TST     ANSR                    ;STANDARD MEMORY RANGE?
2186   015564  001020                          BNE     1$                      ;BR IF YES
2187   015566  005237  002276                  INC     ANSR                    ;RESTORE DEFAULT VALUE
2188   015572                                  GMANID  LOADR,STORE,D,-1,0,30,NO
  (3)  015572  104443                          TRAP    C$GMAN
  (3)  015574  000406                          BR      10002$
  (4)  015576  002322                          .WORD   STORE
  (5)  015600  000042                          .WORD   T$CODE
  (5)  015602  003074                          .WORD   LOADR
  (5)  015604  177777                          .WORD   -1
  (5)  015606  000000                          .WORD   T$LOLIM
  (5)  015610  000030                          .WORD   T$HILIM
  (3)  015612                          10002$:
2189   015612  004737  005144                  JSR     PC,SETADR               ;GET FIRST PAGE ADDRESS
2190   015616  013737  002272  016422          MOV     LOPAG,LOD3              ;STORE LOW PAGE NO.
2191   015624  000403                          BR      LD3                     ;SKIP NEXT INSTRUCTION
2192   015626  012737  100600  016422  1$:     MOV     #100600,LOD3            ;STANDARD PAGE = 200,201  16-32K RANGE
2193   015634  013737  016422  177520  LD3:    MOV     LOD3,PCR                ;LOAD STARTING ADDRESS
2194   015642  012737  000001  002300          MOV     #1,RFLAG                ;INDICATE ROM
2195   015650  012703  002412                  MOV     #SYSROM,R3              ;POINT TO CHECKWORDS
2196   015654  013737  016414  002274          MOV     PGCT,COUNTR             ;PAGE COUNT
2197   015662  012337  002330          SYRTST: MOV     (R3)+,CKWD              ;GET CHECKWORD FOR THIS PAGE
2198   015666  004737  004666                  JSR     PC,MEMTST               ;TEST MEMORY
```

```
                                                TST     REAL                    ;DOES THE MEMORY EXIST?
                                                BEQ     E11                     ;BR IF NO
                                                TST     ERRFLG                  ;ANY OTHER ERRORS?
                                                BEQ     PASSED                  ;BR IF NO
                                                JSR     PC,VIRTAD               ;GET ADDRESS OF ERROR
                                                TST     BCF                     ;LOW BYTE PAGE?
                                                BNE     HIGHB                   ;BR IF NO
                                                MOV     #LOBYT,BYTLOC           ;SET POINTER FOR ERROR MSG.
                                                BR      MSGOUT                  ;PRINT ERROR MESSAGE
                                        HIGHB:  MOV     #HIBYT,BYTLOC           ;POINTER FOR ERROR MSG.
                                        MSGOUT: CMP     #1,ERRFLG               ;CHECKSUM ERROR?
                                                BEQ     E7                      ;BR IF YES
                                                BR      E10                     ;ELSE CHECKWORD ERROR
                                        PASSED: ADD     #1002,PCR               ;ADJUST PAGE IN PCR
                                                DEC     COUNTR                  ;DEC PAGE COUNT
                                                BNE     SYRTST                  ;LOOP UNTIL FINISHED
                                        NEXT:   EXIT    TST                     ;TEST IS FINISHED
                                                TRAP    C$EXIT
                                                .WORD   L10076-.
                                        E7:     ERRDF   43,SYSR,CKSME
                                                TRAP    C$ERDF
                                                .WORD   43
                                                .WORD   SYSR
                                                .WORD   CKSME
                                                CKLOOP
                                                TRAP    C$CLP1
                                                BR      NEXT
                                        E10:    ERRDF   44,SYSR,CWKDE
                                                TRAP    C$ERDF
                                                .WORD   44
                                                .WORD   SYSR
                                                .WORD   CWKDE
                                                CKLOOP
                                                TRAP    C$CLP1
                                                BR      NEXT
                                        E11:    ERRDF   45,SYSR,NONXT
                                                TRAP    C$ERDF
                                                .WORD   45
                                                .WORD   SYSR
                                                .WORD   NONXT
                                                CKLOOP
                                                TRAP    C$CLP1
                                                BR      NEXT
                                                ENDSUB
                                        L10102:
                                                TRAP    C$ESUB

                                                BGNSUB
                                                TRAP    C$BSUB
                                        SYSET:  CLR     ERRFLG                  ;CLEAR ERROR FLAG
                                                GMANID  RWDCT,RESPND,D,-1,10,40,NO
                                                TRAP    C$GMAN
                                                BR      10000$
                                                .WORD   RESPND
                                                .WORD   T$CODE
                                                .WORD   RWDCT
```

```
   (5)  016056  177777                              .WORD   -1
   (5)  016060  000010                              .WORD   T$LOLIM
   (5)  016062  000040                              .WORD   T$HILIM
   (3)  016064                              10000$:
  2230  016064  013737  002334  016414              MOV     RESPND,PGCT             ;STORE PAGE COUNT
  2231  016072  013737  002334  002324              MOV     RESPND,WORDCT           ;COPY WORD COUNT
  2232  016100  012702  002412                      MOV     #SYSROM,R2              ;POINTER TO STORAGE TABLE
  2233  016104  004737  004346                      JSR     PC,INPUT                ;INPUT CHECKWORDS
  2234  016110                                      GMANIL  SYEE,ANSR,1,YES
   (3)  016110  104443                              TRAP    C$GMAN
   (3)  016112  000404                              BR      10001$
   (4)  016114  002276                              .WORD   ANSR
   (5)  016116  000130                              .WORD   T$CODE
   (5)  016120  017200                              .WORD   SYEE
   (5)  016122  000001                              .WORD   1
   (3)  016124                              10001$:
  2235  016124  005737  002276                      TST     ANSR                    ;STANDARD MEMORY RANGE?
  2236  016130  001020                              BNE     1$                      ;BR IF YES
  2237  016132  005237  002276                      INC     ANSR                    ;RESTORE DEFAULT VALUE
  2238  016136                                      GMANID  LOADR,STORE,D,-1,0,30,NO
   (3)  016136  104443                              TRAP    C$GMAN
   (3)  016140  000406                              BR      10002$
   (4)  016142  002322                              .WORD   STORE
   (5)  016144  000042                              .WORD   T$CODE
   (5)  016146  003074                              .WORD   LOADR
   (5)  016150  177777                              .WORD   -1
   (5)  016152  000000                              .WORD   T$LOLIM
   (5)  016154  000030                              .WORD   T$HILIM
   (3)  016156                              10002$:
  2239  016156  004737  005144                      JSR     PC,SETADR               ;GET FIRST PAGE ADDRESS
  2240  016162  013737  002272  016424              MOV     LOPAG,LOD4              ;STORE LOW PAGE NO.
  2241  016170  000403                              BR      LD4                     ;SKIP NEXT INSTRUCTION
  2242  016172  012737  100600  016424  1$:         MOV     #100600,LOD4            ;STANDARD PAGE = 200,201  16-24K RANGE
  2243  016200  013737  016424  177520  LD4:       MOV     LOD4,PCR                ;LOAD STARTING ADDRESS
  2244  016206  005037  002300                      CLR     RFLAG                   ;INDICATE EPROM
  2245  016212  012703  002412                      MOV     #SYSROM,R3              ;POINT TO CHECKWORDS
  2246  016216  013737  016414  002274              MOV     PGCT,COUNTR             ;PAGE COUNT
  2247  016224  012337  002330              SYETST: MOV     (R3)+,CKWD              ;GET CHECKWORD FOR THIS PAGE
  2248  016230  004737  004666                      JSR     PC,MEMTST               ;TEST MEMORY
  2249  016234  005737  002270                      TST     REAL                    ;DOES THIS MEMORY EXIST?
  2250  016240  001452                              BEQ     E14                     ;BR IF NO
  2251  016242  005737  002346                      TST     ERRFLG                  ;ANY ERRORS?
  2252  016246  001421                              BEQ     CONT                    ;BR IF NO
  2253  016250  004737  004526                      JSR     PC,VIRTAD               ;GET ADDRESS OF ERROR
  2254  016254  005737  002266                      TST     BCF                     ;LOW BYTE PAGE?
  2255  016260  001004                              BNE     HBYTE                   ;BR IF NO
  2256  016262  012737  002767  002344              MOV     #LOBYT,BYTLOC           ;SET POINTER FOR ERROR MSG.
  2257  016270  000403                              BR      PRIN                    ;PRINT ERROR MESSAGE
  2258  016272  012737  003031  002344  HBYTE:      MOV     #HIBYT,BYTLOC           ;POINTER FOR ERROR MSG.
  2259  016300  022737  000001  002346  PRIN:       CMP     #1,ERRFLG               ;CHECKSUM ERROR?
  2260  016306  001411                              BEQ     E12                     ;BR IF YES
  2261  016310  000417                              BR      E13                     ;ELSE CHECKWORD ERROR
  2262  016312  062737  001002  177520  CONT:       ADD     #1002,PCR               ;ADJUST PAGE IN PCR
  2263  016320  005337  002274                      DEC     COUNTR                  ;DEC PAGE COUNT
  2264  016324  001337                              BNE     SYETST                  ;LOOP UNTIL FINISHED
  2265  016326                              EXIT    TST                             ;TEST IS FINISHED
```

```
                                                TRAP    C$EXIT
                                                .WORD   L10076-.
                                        E12:    ERRDF   46,SYSE,CKSME
                                                TRAP    C$ERDF
                                                .WORD   46
                                                .WORD   SYSE
                                                .WORD   CKSME
                                                CKLOOP
                                                TRAP    C$CLP1
                                                EXIT    TST
                                                TRAP    C$EXIT
                                                .WORD   L10076-.
                                        E13:    ERRDF   47,SYSE,CWKDE
                                                TRAP    C$ERDF
                                                .WORD   47
                                                .WORD   SYSE
                                                .WORD   CWKDE
                                                CKLOOP
                                                TRAP    C$CLP1
                                                EXIT    TST
                                                TRAP    C$EXIT
                                                .WORD   L10076-.
                                        E14:    ERRDF   50,SYSE,NONXT
                                                TRAP    C$ERDF
                                                .WORD   50
                                                .WORD   SYSE
                                                .WORD   NONXT
                                                CKLOOP
                                                TRAP    C$CLP1
                                                EXIT    TST
                                                TRAP    C$EXIT
                                                .WORD   L10076-.
                                                ENDSUB
                                        L10103:
                                                TRAP    C$ESUB

                                                EXIT TST
                                                TRAP    C$EXIT
                                                .WORD   L10076-.

 2278
 2279  016412  000000                   ADDON:  .WORD   0
 2280  016414  000000                   PGCT:   .WORD   0
 2281  016416  000000                   LOD1:   .WORD   0
 2282  016420  000000                   LOD2:   .WORD   0
 2283  016422  000000                   LOD3:   .WORD   0
 2284  016424  000000                   LOD4:   .WORD   0
 2285  016426  000000                   WORD:   .WORD   0
 2286
 2287
 2288  016430                           BGNMSG  CKSME
   (3) 016430                           CKSME::
 2289  016430                           PRINTB  #ERM6,BYTLOC
   (8) 016430  013746  002344                   MOV     BYTLOC,-(SP)
   (7) 016434  012746  016632                   MOV     #ERM6,-(SP)
   (6) 016440  012746  000002                   MOV     #2,-(SP)
   (3) 016444  010600                           MOV     SP,R0
```

```
   (4)  016446  104414                          TRAP    C$PNTB
   (4)  016450  062706  000006                  ADD     #6,SP
 2290   016454  004737  004526          JSR     PC,VIRTAD
 2291   016460  004737  004252          JSR     PC,VIPRI
 2292   016464                          ENDMSG
   (3)  016464                          L10104:
   (3)  016464  104423                          TRAP    C$MSG
 2293
 2294   016466                          BGNMSG  CWKDE
   (3)  016466                          CWKDE::
 2295   016466                          PRINTB  #ERM5
   (7)  016466  012746  016602                  MOV     #ERM5,-(SP)
   (6)  016472  012746  000001                  MOV     #1,-(SP)
   (3)  016476  010600                          MOV     SP,R0
   (4)  016500  104414                          TRAP    C$PNTB
   (4)  016502  062706  000004                  ADD     #4,SP
 2296   016506  004737  004526          JSR     PC,VIRTAD
 2297   016512  004737  004252          JSR     PC,VIPRI
 2298   016516                          PRINTB  #REGDT,CKWD,BADWD
   (9)  016516  013746  002332                  MOV     BADWD,-(SP)
   (8)  016522  013746  002330                  MOV     CKWD,-(SP)
   (7)  016526  012746  003670                  MOV     #REGDT,-(SP)
   (6)  016532  012746  000003                  MOV     #3,-(SP)
   (3)  016536  010600                          MOV     SP,R0
   (4)  016540  104414                          TRAP    C$PNTB
   (4)  016542  062706  000010                  ADD     #10,SP
 2299   016546                          ENDMSG
   (3)  016546                          L10105:
   (3)  016546  104423                          TRAP    C$MSG
 2300
 2301   016550                          BGNMSG  NONXT
   (3)  016550                          NONXT::
 2302   016550                          PRINTB  #LOST
   (7)  016550  012746  016661                  MOV     #LOST,-(SP)
   (6)  016554  012746  000001                  MOV     #1,-(SP)
   (3)  016560  010600                          MOV     SP,R0
   (4)  016562  104414                          TRAP    C$PNTB
   (4)  016564  062706  000004                  ADD     #4,SP
 2303   016570  004737  004526          JSR     PC,VIRTAD
 2304   016574  004737  004252          JSR     PC,VIPRI
 2305   016600                          ENDMSG
   (3)  016600                          L10106:
   (3)  016600  104423                          TRAP    C$MSG
 2306
 2307   016602  040445  047111  047503  ERM5:   .ASCIZ  /%AINCORRECT CHECKWORD%N/
        016610  051122  041505  020124
        016616  044103  041505  053513
        016624  051117  022504  000116
 2308
 2309   016632  040445  044103  041505  ERM6:   .ASCIZ  /%ACHECKSUM ERROR%N%T%N/
        016640  051513  046525  042440
        016646  051122  051117  047045
        016654  052045  047045     000
 2310
 2311   016661     045  047101  047117  LOST:   .ASCIZ  /%ANON-EXISTENT MEMORY%N/
        016666  042455  044530  052123
```

```
                016674  047105  020124  042515
                016702  047515  054522  047045
                016710     000
  2312
  2313  016711     110  053517  046440  RWDCT:  .ASCIZ  /HOW MANY CHECKWORDS WILL BE INPUT/
        016716  047101  020131  044103
        016724  041505  053513  051117
        016732  051504  053440  046111
        016740  020114  042502  044440
        016746  050116  052125     000
  2314
  2315  016753     101  054516  040440  EXEC:   .ASCIZ  /ANY ADDITIONAL MEMORY /
        016760  042104  052111  047511
        016766  040516  020114  042515
        016774  047515  054522  000040
  2316
  2317  017002  054105  040520  042116  EXPND:  .ASCIZ  /EXPANDED DIAGNOSTIC ROM/
        017010  042105  042040  040511
        017016  047107  051517  044524
        017024  020103  047522  000115
  2318
  2319  017032  050105  047522  020115  EPRM:   .ASCIZ  /EPROM IN SOCKETS/
        017040  047111  051440  041517
        017046  042513  051524     000
  2320
  2321  017053     123  051531  042524  SYSR:   .ASCIZ  /SYSTEM ROM/
        017060  020115  047522  000115
  2322
  2323  017066  054523  052123  046505  SYSE:   .ASCIZ  /SYSTEM EPROM/
        017074  042440  051120  046517
        017102     000
  2324
  2325  017103     105  050130  047101  EXADD:  .ASCIZ  /EXPANDED ROM IN 2-4K /
        017110  042504  020104  047522
        017116  020115  047111  031040
        017124  032055  020113     000
  2326
  2327  017131     105  051120  046517  EPADD:  .ASCIZ  /EPROM IN 4-6K /
        017136  044440  020116  026464
        017144  045466  000040
  2328
  2329  017150  054523  052123  046505  SRR:    .ASCIZ  /SYSTEM ROM START AT 16K/
        017156  051040  046517  051440
        017164  040524  052122  040440
        017172  020124  033061  000113
  2330
  2331  017200  054523  052123  046505  SYEE:   .ASCIZ  /SYSTEM EPROM START AT 16K/
        017206  042440  051120  046517
        017214  051440  040524  052122
        017222  040440  020124  033061
        017230  000113
  2332
  2333
  2334                                          .EVEN
  2335  017232                                  ENDTST
   (3)  017232                          L10076:
```

```
  (3)  017232  104401                        TRAP    CSETST
2342
2343
2350
2356
2357
2363
2364
2376
2377
2383                                .TITLE PARAMETER CODING
2384                                .SBTTL  IDENTIFICATION
2390
2391
2392                                .SBTTL  HARDWARE PARAMETER CODING SECTION
2393
2394
2395                                ;++
2396                                ; THE HARDWARE PARAMETER CODING SECTION CONTAINS MACROS
2397                                ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
2398                                ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
2399                                ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
2400                                ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
2401                                ; WITH THE OPERATOR.
2402                                ;--
2403
2404  017234                                BGNHRD
  (3)  017234  000107                       .WORD L10107-L$HARD/2
  (3)  017236                       L$HARD::
2405
2411  017236                                GPRMD   UNIT,0,0,160000,0,16,YES
  (4)  017236  000032                       .WORD   T$CODE
  (4)  017240  017316                       .WORD   UNIT
  (4)  017242  160000                       .WORD   160000
  (4)  017244  000000                       .WORD   T$LOLIM
  (4)  017246  000016                       .WORD   T$HILIM
2412  017250                                GPRMD   INTVEC,2,0,-1,66,100,YES
  (4)  017250  001032                       .WORD   T$CODE
  (4)  017252  017332                       .WORD   INTVEC
  (4)  017254  177777                       .WORD   -1
  (4)  017256  000066                       .WORD   T$LOLIM
  (4)  017260  000100                       .WORD   T$HILIM
2413  017262                                GPRMD   LEV,4,0,-1,6,7,YES
  (4)  017262  002032                       .WORD   T$CODE
  (4)  017264  017363                       .WORD   LEV
  (4)  017266  177777                       .WORD   -1
  (4)  017270  000006                       .WORD   T$LOLIM
  (4)  017272  000007                       .WORD   T$HILIM
2414  017274                                GPRMD   RKSW,6,0,-1,0,7777,YES
  (4)  017274  003032                       .WORD   T$CODE
  (4)  017276  017403                       .WORD   RKSW
  (4)  017300  177777                       .WORD   -1
  (4)  017302  000000                       .WORD   T$LOLIM
  (4)  017304  007777                       .WORD   T$HILIM
2415  017306                                GPRML   PAX,10,1,NO
  (4)  017306  004120                       .WORD   T$CODE
```

```
  (4)  017310  017432                        .WORD   PAX
  (4)  017312  000001                        .WORD   1
2416
2417  017314                                EXIT HRD
  (7)  017314  060004                        .WORD   T%CODE
2418
2425  017316  047125  052111  047040        UNIT:   .ASCIZ  /UNIT NUMBER/
       017324  046525  042502  000122
2426  017332  047111  042524  051122        INTVEC: .ASCIZ  /INTERRUPT VECTOR ADDRESS/
       017340  050125  020124  042526
       017346  052103  051117  040440
       017354  042104  042522  051523
       017362     000
2427  017363     111  052116  051105        LEV:    .ASCIZ  /INTERRUPT LEVEL/
       017370  052522  052120  046040
       017376  053105  046105     000
2428  017403     122  041517  042513        RKSW:   .ASCIZ  /ROCKER SWITCH SETTINGS/
       017410  020122  053523  052111
       017416  044103  051440  052105
       017424  044524  043516  000123
2429  017432  042524  052123  047111        PAX:    .ASCIZ  /TESTING A KDF11-B/
       017440  020107  020101  042113
       017446  030506  026461  000102
2430                                        .EVEN
2431
2432  017454                                ENDHRD
  (2)                                       .EVEN
  (3)  017454                           L10107:
2433                                    .SBTTL  SOFTWARE PARAMETER CODING SECTION
2434
2435                                    ;++
2436                                    ; THE SOFTWARE PARAMETER CODING SECTION CONTAINS MACROS
2437                                    ; THAT ARE USED BY THE SUPERVISOR TO BUILD P-TABLES.  THE
2438                                    ; MACROS ARE NOT EXECUTED AS MACHINE INSTRUCTIONS BUT ARE
2439                                    ; INTERPRETED BY THE SUPERVISOR AS DATA STRUCTURES.  THE
2440                                    ; MACROS ALLOW THE SUPERVISOR TO ESTABLISH COMMUNICATIONS
2441                                    ; WITH THE OPERATOR.
2442                                    ;--
2443
2444  017454                                BGNSFT
  (3)  017454  000161                       .WORD L10110-L$SOFT/2
  (3)  017456                           L$SOFT::
2445  017456                                GPRMD   CKW1,0,0,-1,0,177777,YES
  (4)  017456  000032                       .WORD   T$CODE
  (4)  017460  017600                       .WORD   CKW1
  (4)  017462  177777                       .WORD   -1
  (4)  017464  000000                       .WORD   T$LOLIM
  (4)  017466  177777                       .WORD   T$HILIM
2446  017470                                GPRMD   CKW2,2,0,-1,0,177777,YES
  (4)  017470  001032                       .WORD   T$CODE
  (4)  017472  017655                       .WORD   CKW2
  (4)  017474  177777                       .WORD   -1
  (4)  017476  000000                       .WORD   T$LOLIM
  (4)  017500  177777                       .WORD   T$HILIM
2447  017502                                GPRMD   CKW3,4,0,-1,0,177777,YES
  (4)  017502  002032                       .WORD   T$CODE
```

```
   (4)  017504  017673                          .WORD   CKW3
   (4)  017506  177777                          .WORD   -1
   (4)  017510  000000                          .WORD   T$LOLIM
   (4)  017512  177777                          .WORD   T$HILIM
2448    017514                                  GPRMD   C*W4,6,0,-1,0,177777,YES
   (4)  017514  003032                          .WORD   T$CODE
   (4)  017516  017711                          .WORD   CKW4
   (4)  017520  177777                          .WORD   -1
   (4)  017522  000000                          .WORD   T$LOLIM
   (4)  017524  177777                          .WORD   T$HILIM
2449    017526                                  GPRMD   CKW5,10,0,-1,0,177777,YES
   (4)  017526  004032                          .WORD   T$CODE
   (4)  017530  017727                          .WORD   CKW5
   (4)  017532  177777                          .WORD   -1
   (4)  017534  000000                          .WORD   T$LOLIM
   (4)  017536  177777                          .WORD   T$HILIM
2450    017540                                  GPRMD   CKW6,12,0,-1,0,177777,YES
   (4)  017540  005032                          .WORD   T$CODE
   (4)  017542  017745                          .WORD   CKW6
   (4)  017544  177777                          .WORD   -1
   (4)  017546  000000                          .WORD   T$LOLIM
   (4)  017550  177777                          .WORD   T$HILIM
2451    017552                                  GPRMD   CKW7,14,0,-1,0,177777,YES
   (4)  017552  006032                          .WORD   T$CODE
   (4)  017554  017763                          .WORD   CKW7
   (4)  017556  177777                          .WORD   -1
   (4)  017560  000000                          .WORD   T$LOLIM
   (4)  017562  177777                          .WORD   T$HILIM
2452    017564                                  GPRMD   CKW8,16,0,-1,0,177777,YES
   (4)  017564  007032                          .WORD   T$CODE
   (4)  017566  020001                          .WORD   CKW8
   (4)  017570  177777                          .WORD   -1
   (4)  017572  000000                          .WORD   T$LOLIM
   (4)  017574  177777                          .WORD   T$HILIM
2453
2454    017576                                  EXIT SFT
   (7)  017576  111004                          .WORD   T$CODE
2461
2462    017600  044103  041505  053513  CKW1:   .ASCIZ  /CHECKWORDS FOR DIAGNOSTIC ROM. CHECKWORD 1: /
        017606  051117  051504  043040
        017614  051117  042040  040511
        017622  047107  051517  044524
        017630  020103  047522  027115
        017636  041440  042510  045503
        017644  047527  042122  030440
        017652  020072     000
2463    017655     103  042510  045503  CKW2:   .ASCIZ  /CHECKWORD 2: /
        017662  047527  042122  031040
        017670  020072     000
2464    017673     103  042510  045503  CKW3:   .ASCIZ  /CHECKWORD 3: /
        017700  047527  042122  031440
        017706  020072     000
2465    017711     103  042510  045503  CKW4:   .ASCIZ  /CHECKWORD 4: /
        017716  047527  042122  032040
        017724  020072     000
2466    017727     103  042510  045503  CKW5:   .ASCIZ  /CHECKWORD 5: /
```

```
                                                                                    E 6
        017734  047527  042122  032440
        017742  020072     000
 2467   017745     103  042510  045503  CKW6:   .ASCIZ  /CHECKWORD 6: /
        017752  047527  042122  033040
        017760  020072     000
 2468   017763     103  042510  045503  CKW7:   .ASCIZ  /CHECKWORD 7: /
        017770  047527  042122  033440
        017776  020072     000
 2469   020001     103  042510  045503  CKW8:   .ASCIZ  /CHECKWORD 8: /
        020006  047527  042122  034040
        020014  020072     000
 2470           020020                          .EVEN
 2477
 2478
 2479   020020                                  ENDSFT
  (2)                                           .EVEN
  (3)   020020                          L10110:
 2480
 2481           020070                  .=.+50
 2482   020070                                  LASTAD
  (2)                                           .EVEN
  (4)   020070  000000                          .WORD   0
  (4)   020072  000000                          .WORD   0
  (3)   020074                          L$LAST::
 2483
 2484           000001                  .END
```

```
ACTSUM  002304            703#   874*   878*   956    973   1830   1848
ADDON   016412           1208*  2037*  2051   2052  2279#
ADDTL   015406           2162#  2168   2171   2174
ADR   = 000020 G          673#
ANSR    002276            700#  1209*  2078   2079  2081*  2131   2132  2134*  2184  2185  2187*  2234  2235
                         2237*
ASSEMB= 000010            521
BADWD   002332            714#   986*   988*   993*  2298
BCF     002266            696#   873    876    950*   963*  1821*  1839*  2098  2151  2204  2254
BDDAT   003324            778#   820
BEVENT  007710 G         1622#
BEVREG= 177546           1537#  1545*  1558*  1577*  1590*  1607*
BIT0  = 000001 G          673#  1730   1750   1761
BIT00 = 000001 G          673#
BIT01 = 000002 G          673#
BIT02 = 000004 G          673#
BIT03 = 000010 G          673#
BIT04 = 000020 G          673#
BIT05 = 000040 G          673#
BIT06 = 000100 G          673#  1545   1558   1577   1590   1607
BIT07 = 000200 G          673#
BIT08 = 000400 G          673#
BIT09 = 001000 G          673#
BIT1  = 000002 G          673#
BIT10 = 002000 G          673#
BIT11 = 004000 G          673#  1734
BIT12 = 010000 G          673#
BIT13 = 020000 G          673#
BIT14 = 040000 G          673#
BIT15 = 100000 G          673#  1351   1367   1492   1508   1736
BIT2  = 000004 G          673#
BIT3  = 000010 G          673#
BIT4  = 000020 G          673#
BIT5  = 000040 G          673#
BIT6  = 000100 G          673#
BIT7  = 000200 G          673#
BIT8  = 000400 G          673#
BIT9  = 001000 G          673#
BOE   = 000400 G          673#
BVERR1  007720 G         1552  1628#
BVERR2  007766 G         1565  1633#
BVERR3  010034 G         1615  1638#
BVERR4  010102 G         1584  1643#
BVERR5  010150 G         1597  1648#
BYTINS  003367            780#   825
BYTLOC  002344            719#  2100*  2102*  2153*  2155*  2206*  2208*  2256*  2258*  2289
CHECKW  014165           1933  1995#
CHKSUM  004302            872#   954    971   1828   1846
CHKWRD  013104           1865  1898   1915   1932  1966#
CKERR   002724            744#  1949   1957
CKSME   016430 G         2114  2166   2216   2266  2288#
CKWD    002330            713#   983    990   2091*  2144*  2197*  2247*  2298
CKW1    017600           2445  2462#
CKW2    017655           2446  2463#
CKW3    017673           2447  2464#
CKW4    017711           2448  2465#
```

```
CKW5     017727            2449    2466#
CKW6     017745            2450    2467#
CKW7     017763            2451    2468#
CKW8     020001            2452    2469#
CONT     016312            2252    2262#
COUNTR   002274             699#   1816*   1818*   1858*   1869*   1871*   1875*   1899*   1902*   1916*   1919*   1931*   1934*
                           2090*   2107*   2141*   2160*   2196*   2213*   2246*   2263*
CWDERR   002743             746#
CWKDE    016466 G          2117    2169    2219    2269    2294#
C$AU   = 000052             521#
C$AUTO= 000061              521#   1194
C$BRK  = 000022             521#   1672    1685    1689    1693
C$BSEG= 000004              521#
C$BSUB= 000002              521#   1256    1267    1279    1291    1303    1313    1325    1337    1349    1365    1396    1407
                           1420    1432    1444    1455    1466    1478    1490    1506    1543    1557    1576    1589    1606
                           1799    1838    1855    1864    1881    2031    2073    2125    2177    2227
C$CEFG= 000045              521#
C$CLCK= 000062              521#
C$CLEA= 000012              521#   1235
C$CLOS= 000035              521#
C$CLP1= 000006              521#    929    1262    1264    1274    1276    1286    1288    1298    1300    1308    1310    1320
                           1322    1332    1334    1344    1346    1360    1362    1378    1380    1402    1404    1414    1416
                           1427    1429    1439    1441    1451    1453    1462    1464    1473    1475    1485    1487    1501
                           1503    1519    1521    1553    1566    1585    1598    1616    1722    1825    1827    1834    1843
                           1845    1852    1929    2115    2118    2121    2167    2170    2173    2217    2220    2223    2267
                           2270    2273
C$CVEC= 000036              521#   1212
C$DCLN= 000044              521#
C$DODU= 000051              521#
C$DRPT= 000024              521#
C$DU   = 000053             521#
C$EDIT= 000003              521#    553
C$ERDF= 000055              521#    928    1261    1273    1285    1297    1307    1319    1331    1343    1359    1377    1401
                           1413    1426    1438    1450    1461    1472    1484    1500    1518    1552    1565    1584    1597
                           1615    1721    1824    1833    1842    1851    1928    2114    2117    2120    2166    2169    2172
                           2216    2219    2222    2266    2269    2272
C$ERHR= 000056              521#
C$ERRO= 000060              521#
C$ERSF= 000054              521#
C$ERSO= 000057              521#
C$ESCA= 000010              521#
C$ESEG= 000005              521#
C$ESUB= 000003              521#   1265    1277    1289    1301    1311    1323    1335    1347    1363    1381    1405    1417
                           1430    1442    1454    1465    1476    1488    1504    1522    1555    1568    1587    1600    1618
                           1835    1853    1860    1877    1936    2070    2123    2175    2225    2275
C$ETST= 000001              521#   1383    1523    1660    1699    1787    2004    2335
C$EXIT= 000032              521#   1220    1263    1275    1287    1299    1309    1321    1333    1345    1361    1379    1394
                           1403    1415    1428    1440    1452    1463    1474    1486    1502    1520    1541    1574    1604
                           1619    1680    1697    1723    1770    1826    1844    1940    2034    2069    2113    2215    2265
                           2268    2271    2274    2277
C$GETB= 000026              521#
C$GETW= 000027              521#
C$GMAN= 000043              521#    893    1804    1809    2051    2054    2057    2061    2065    2078    2082    2127    2131
                           2135    2179    2184    2188    2229    2234    2238
C$GPHR= 000042              521#   1150
C$GPLO= 000030              521#
```

```
C$GPRI= 000040          521#
C$INIT= 000011          521#  1185
C$INLP= 000020          521#
C$MANI= 000050          521#  1676  1712  1800  1926  2035
C$MEM = 000031          521#
C$MSG = 000023          521#   812   817   822   827   831   835   839  1631  1636  1641  1646  1651
                       1778  1946  1950  1954  1958  1963  2292  2299  2305
C$OPEN= 000034          521#
C$PNTB= 000014          521#   810   815   820   825   830   834   838  1629  1630  1634  1635  1639
                       1640  1644  1645  1649  1650  1777  1945  1949  1953  1957  1961  2289  2295
                       2298  2302
C$PNTF= 000017          521#   843   892  1746  1752  1763  1768  1891  1906  1910  1912  1921  1930
                       1933
C$PNTS= 000016          521#
C$PNTX= 000015          521#   811   816   821   826
C$QIO = 000377          521#
C$RDBU= 000007          521#
C$REFG= 000047          521#
C$RESE= 000033          521#  1608
C$REVI= 000003          521#   553
C$RFLA= 000021          521#
C$RPT = 000025          521#  1139
C$SEFG= 000046          521#
C$SPRI= 000041          521#  1162  1546  1549  1559  1562  1578  1581  1591  1594  1609  1612
C$SVEC= 000037          521#  1544
C$TPRI= 000013          521#
DADDR   014272          1804  2001#
DATOUT  015006          2101  2103#
DELCNT  002350           721#  1046*  1048
DERR1   012726 G        1824  1944#
DERR2   012754 G        1833  1948#
DERR3   013002 G        1842  1952#
DERR4   013030 G        1851  1956#
DERR5   013056 G        1928  1960#
DFLTST  014562          2036  2049  2053  2067  2069#
DFPTBL  002144 G         587#
DIAGER  003556           786#   838
DIAGMC= 000000           521
DIAIN   014436          2054#
DLOOP   011762          1821#  1859
DRLP    012724          1807*  1811*  1812  1942#
DRTST   011724          1814#
DSPCOD  002122 G         569#
EF.CON= 000036 G         673#
EF.NEW= 000035 G         673#
EF.PWR= 000034 G         673#
EF.RES= 000037 G         673#
EF.STA= 000040 G         673#
EPADD   017131          2131  2327#
EPRIN   014460          2057#  2111
EPRM    017032          2057  2166  2169  2172  2319#
EPRMT   015126          2060  2126#
EPROM   002372           723#  2129  2143
EPRTST  015304          2144#  2161
ERM5    016602          2295  2307#
ERM6    016632          2289  2309#
```

```
ERRFLG  002346          720#    959*    976*    987*    992*   2074*   2095    2103   2126*   2148    2156   2178*   2201
                       2209    2228*   2251    2259
EVL   = 000004 G        673#
EXADD   017103         2078    2325#
EXEC    016753         2051    2315#
EXPDIA  002352          722#    2076    2089
EXPND   017002         2054    2114    2117    2120    2317#
EXPROM  014572         2056    2074#
EXPSUM  002302          702#    955*    956*    957     972*    973*    974    1829*   1830*   1831    1847*   1848*   1849
EXPTST  014732         2091#   2108
ESEND = 002100          521#
ESLOAD= 000035          521#    553
E1      015056         2104    2114#
E10     016004         2211    2219#
E11     016020         2200    2222#
E12     016332         2260    2266#
E13     016350         2261    2269#
E14     016366         2250    2272#
E2      015072         2105    2117#
E3      015106         2094    2120#
E4      015424         2157    2166#
E5      015440         2158    2169#
E6      015454         2147    2172#
E7      015770         2210    2216#
FSAU  = 000015          521#
FSAUTO= 000020          521#    1193    1194
FSBGN = 000040          521#    536     554     569     571     672     684     692     725     809     814     819     824
                        829     833     837     1138    1149    1187    1193    1202    1220    1254    1256    1263    1265
                       1267    1275    1277    1279    1287    1289    1291    1299    1301    1303    1309    1311    1313
                       1321    1323    1325    1333    1335    1337    1345    1347    1349    1361    1363    1365    1379
                       1381    1383    1390    1394    1396    1403    1405    1407    1415    1417    1420    1428    1430
                       1432    1440    1442    1444    1452    1454    1455    1463    1465    1466    1474    1476    1478
                       1486    1488    1490    1502    1504    1506    1520    1522    1523    1535    1541    1543    1555
                       1557    1568    1574    1576    1587    1589    1600    1604    1606    1618    1619    1622    1628
                       1633    1638    1643    1648    1660    1667    1680    1697    1699    1710    1723    1770    1776
                       1787    1797    1799    1826    1835    1838    1844    1853    1855    1860    1864    1877    1881
                       1936    1940    1944    1948    1952    1956    1960    2004    2029    2031    2034    2069    2070
                       2073    2113    2123    2125    2175    2177    2215    2225    2227    2265    2268    2271    2274
                       2275    2277    2288    2294    2301    2335    2404    2417    2444    2454
FSCLEA= 000007          521#    1202    1235
FSDU  = 000016          521#
FSEND = 000041          521#    536     554     569     571     672     684     692     725     812     817     822     827
                        831     835     839     1139    1185    1194    1220    1235    1254    1256    1263    1265    1267
                       1275    1277    1279    1287    1289    1291    1299    1301    1303    1309    1311    1313    1321
                       1323    1325    1333    1335    1337    1345    1347    1349    1361    1363    1365    1379    1381
                       1383    1390    1394    1396    1403    1405    1407    1415    1417    1420    1428    1430    1432
                       1440    1442    1444    1452    1454    1455    1463    1465    1466    1474    1476    1478    1486
                       1488    1490    1502    1504    1506    1520    1522    1523    1535    1541    1543    1555    1557
                       1568    1574    1576    1587    1589    1600    1604    1606    1618    1619    1624    1631    1636
                       1641    1646    1651    1660    1667    1680    1697    1699    1710    1723    1770    1778    1787
                       1797    1799    1826    1835    1838    1844    1853    1855    1860    1864    1877    1881    1936
                       1940    1946    1950    1954    1958    1963    2004    2029    2031    2034    2069    2070    2073
                       2113    2123    2125    2175    2177    2215    2225    2227    2265    2268    2271    2274    2275
                       2277    2292    2299    2305    2335    2417    2432    2454    2479
FSHARD= 000004          521#    2404    2417    2432    2454
FSHW  = 000013          521#    587     601
```

```
FSINIT= 000006   521#  1149  1185
FSJMP = 000050   521#  1220  1263  1275  1287  1299  1309  1321  1333  1345  1361  1379  1394
                1403  1415  1428  1440  1452  1463  1474  1486  1502  1520  1541  1574  1604
                1619  1680  1697  1723  1770  1826  1844  1940  2034  2069  2113  2215  2265
                2268  2271  2274  2277  2417  2454
FSMOD = 000000   521#   536   554   569   571   672   684   692   725
FSMSG = 000011   521#   809   812   814   817   819   822   824   827   829   831   833   835
                 837   839  1628  1631  1633  1636  1638  1641  1643  1646  1648  1651  1776
                1778  1944  1946  1948  1950  1952  1954  1956  1958  1960  1963  2288  2292
                2294  2299  2301  2305
FSPROT= 000021   521#  1187  1191
FSPWR = 000017   521#
FSRPT = 000012   521#  1138  1139
FSSEG = 000003   521#
FSSOFT= 000005   521#  2444  2454  2479
FSSRV = 000010   521#  1622  1624
FSSUB = 000002   521#  1256  1265  1267  1277  1279  1289  1291  1301  1303  1311  1313  1323
                1325  1335  1337  1347  1349  1363  1365  1381  1396  1405  1407  1417  1420
                1430  1432  1442  1444  1454  1455  1465  1466  1476  1478  1488  1490  1504
                1506  1522  1543  1555  1557  1568  1576  1587  1589  1600  1606  1618  1799
                1835  1838  1853  1855  1860  1864  1877  1881  1936  2031  2070  2073  2123
                2125  2175  2177  2225  2227  2275
FSSW  = 000014   521#   610   653
FSTEST= 000001   521#  1254  1383  1390  1523  1535  1660  1667  1699  1710  1787  1797  2004
                2029  2335
GET     014414  2039  2051#
GETAD   011656  1806  1809#
GLBDAT  002260 G  692#
GLBEQA  002260 G  672#
GSCNTO= 000200   521#
GSDELM= 000372   521#
GSDISP= 000003   521#
GSEXCP= 000400   521#
GSMILI= 000002   521#
GSLOLI= 000001   521#
GSNO  = 000000   521#   893  1809  2054  2057  2061  2065  2082  2127  2135  2179  2188  2229
                2238  2415
GSOFFS= 000400   521#   893  1804  1809  2051  2054  2057  2061  2065  2078  2082  2127  2131
                2135  2179  2184  2188  2229  2234  2238  2411  2412  2413  2414  2415  2445
                2446  2447  2448  2449  2450  2451  2452
GSOFSI= 000376   521#   893  1804  1809  2051  2054  2057  2061  2065  2078  2082  2127  2131
                2135  2179  2184  2188  2229  2234  2238  2411  2412  2413  2414  2415  2445
                2446  2447  2448  2449  2450  2451  2452
GSPRMA= 000001   521#
GSPRMD= 000002   521#   893  1809  2082  2127  2135  2179  2188  2229  2238  2411  2412  2413
                2414  2445  2446  2447  2448  2449  2450  2451  2452
GSPRML= 000000   521#  1804  2051  2054  2057  2061  2065  2078  2131  2184  2234  2415
GSRADA= 000140   521#
GSRADB= 000000   521#
GSRADD= 000040   521#  1809  2082  2127  2135  2179  2188  2229  2238
GSRADL= 000120   521#  1804  2051  2054  2057  2061  2065  2078  2131  2184  2234  2415
GSRADO= 000020   521#   893  2411  2412  2413  2414  2445  2446  2447  2448  2449  2450  2451
                2452
GSXFER= 000004   521#  2417  2454
GSYES = 000010   521#  1804  2051  2078  2131  2184  2234  2411  2412  2413  2414  2445  2446
                2447  2448  2449  2450  2451  2452
```

```
HBYTE   016272          2255    2258#
HELP  = 000000            7#      20      28      39      46     131     139     162     176     191     201     226     313
                        327     387     400     426     515     528#    545     556     572     589     612     659#    675
                        763     793     847    1056    1064    1071    1079    1086    1094    1101    1110    1116    1122
                       1130#   1163    1172    1213    1222    1240#   2336    2344    2351    2358    2365    2378    2386#
                       2406    2419    2455    2471
HIADD   015352          2152    2155#
HIBYT   003031           750#   2102    2155    2208    2258
HIBYTE  004750           952     963#
HIGH    015000          2099    2102#
HIGHB   015730          2205    2208#
HIRANG  002342           718#    843     933*    934*    937*
HIROM   013463          1957    1983#
HOE   = 100000 G         673#
HRAERR  013404          1953    1981#
IBE   = 010000 G         673#
ICOUNT  007716          1542*   1550    1554*   1563    1567*   1582    1586*   1595    1599*   1613    1617*   1623*   1626#
                        1630    1635    1640    1645    1650
IDU   = 000040 G         673#
IER   = 020000 G         673#
INLP    004366           893#    897
INPUT   004346           892#   2077    2130    2183    2233
INSTR   004424           892     900#
INTCT   010272          1630    1635    1640    1645    1650    1654#
INTSR   007710          1544    1621#
INTVEC  017332          2412    2426#
INWORD  004512           893     902#
ISR   = 000100 G         673#
IXE   = 004000 G         673#
I$AU  = 000041           521#
I$AUTO= 000041           521#   1193#   1194#
I$CLN = 000041           521#   1202#   1220    1235#
I$DU  = 000041           521#
I$HRD = 000041          2404#   2432#
I$INIT= 000041           521#   1149#   1185#
I$MOD = 000041           521#    536#    554#    569#    571#    672#    684#    692#    725#
I$MSG = 000041           521#    809#    812#    814#    817#    819#    822#    824#    827#    829#    831#    833#    835#
                         837#    839#   1628#   1631#   1633#   1636#   1638#   1641#   1643#   1646#   1648#   1651#   1776#
                        1778#   1944#   1946#   1948#   1950#   1952#   1954#   1956#   1958#   1960#   1963#   2288#   2292#
                        2294#   2299#   2301#   2305#
I$PROT= 000040           521#   1187#
I$PTAB= 000041           521#
I$PUR = 000041           521#
I$RPT = 000041           521#   1138#   1139#
I$SEG = 000041           521#   1254    1256    1267    1279    1291    1303    1313    1325    1337    1349    1365    1390
                        1396    1407    1420    1432    1444    1455    1466    1478    1490    1506    1535    1543    1557
                        1576    1589    1606    1667    1710    1797    1799    1838    1855    1864    1881    2029    2031
                        2073    2125    2177    2227
I$SETU= 000041           521#
I$SFT = 000041          2444#   2479#
I$SRV = 000041           521#   1622#   1624#
I$SUB = 000041           521#   1254    1256#   1265#   1267#   1277#   1279#   1289#   1291#   1301#   1303#   1311#   1313#
                       1323#   1325#   1335#   1337#   1347#   1349#   1363#   1365#   1381#   1390    1396#   1405#   1407#
                       1417#   1420#   1430#   1432#   1442#   1444#   1454#   1455#   1465#   1466#   1476#   1478#   1488#
                       1490#   1504#   1506#   1522#   1535    1543#   1555#   1557#   1568#   1576#   1587#   1589#   1600#
                       1606#   1618#   1667    1710    1797    1799#   1835#   1838#   1853#   1855#   1860#   1864#   1877#
```

```
                    1881#  1936#  2029   2031#  2070#  2073#  2113   2123#  2125#  2175#  2177#  2225#  2227#
                    2275#
I$TST = 000041       521#  1254#  1256   1263   1267   1275   1279   1287   1291   1299   1303   1309   1313
                    1321   1325   1333   1337   1345   1349   1361   1365   1379   1383#  1390#  1394   1396
                    1403   1407   1415   1420   1428   1432   1440   1444   1452   1455   1463   1466   1474
                    1478   1486   1490   1502   1506   1520   1523#  1535#  1541   1543   1557   1574   1576
                    1589   1604   1606   1619   1660#  1667#  1680   1697   1699#  1710#  1723   1770   1787#
                    1797#  1799   1826   1838   1844   1855   1864   1881   1940   2004#  2029#  2031   2034
                    2069   2073   2125   2177   2215   2227   2265   2268   2271   2274   2277   2335#
J$JMP = 000167        521#
KDF11B  002262        694#  1154*  1392   1572   1602   1714   1727   1732   1758   2032
LCP     002260        693#  1161*  1814   1867   1882
LCPTBL  013210       1886   1891   1975#
LD1     014704       2041   2085   2087#
LD2     015260       2044   2138   2140#
LD3     015634       2047   2191   2193#
LD4     016200       2050   2241   2243#
LEV     017363       2413   2427#
LOAD    005220       1015   1024#
LOADR   003074        752#  1809   2082   2135   2188   2238
LOBYT   002767        748#  2100   2153   2206   2256
LOBYTE  004672        950#
LOD1    016416       2040   2084*  2086*  2087   2281#
LOD2    016420       2042   2137*  2139*  2140   2282#
LOD3    016422       2045   2190*  2192*  2193   2283#
LOD4    016424       2048   2240*  2242*  2243   2284#
LOE   = 040000 G      673#
LOOP    005202       1018#  1022
LOPAG   002272        698#  1024*  1026*  1811   2084   2137   2190   2240
LORANG  002340        717#   843    932*   933
LOST    016661       2302   2311#
LOT   = 000010 G      673#
LOWROM  013344       1949   1979#
LP      011056       1728   1730#  1741
LPADD   004544        918#   924    931
LRAERR  013266       1945   1977#
LSREG = 177524        683#  1669*  1673*  1682*  1686*  1690*  1694*  1717   1724   1777
L$ACP   002110 G      553#
L$APT   002036 G      553#
L$AUT   002070 G      553#
L$AUTO  005376 G      553   1193#
L$CCP   002106 G      553#
L$CLEA  005400 G      553   1202#
L$CO    002032 G      553#
L$DEPO  002011 G      553#
L$DESC  003126 G      553    760#
L$DESP  002076 G      553#
L$DEVP  002060 G      553#
L$DISP  002124 G      553    570#
L$DLY   002116 G      553#
L$DTP   002040 G      553#
L$DTYP  002034 G      553#
L$DUT   002072 G      553#
L$DVTY  003200 G      553    761#
L$EF    002052 G      553#
L$ENVI  002044 G      553#
```

```
L$ETP   002102 G          553#
L$EXP1  002046 G          553#
L$EXP4  002064 G          553#
L$EXP5  002066 G          553#
L$HARD  017236 G          553    2404#
L$HIME  002120 G          553#
L$HPCP  002016 G          553#
L$HPTP  002022 G          553#
L$HW    002144 G          553     587#
L$ICP   002104 G          553#
L$INIT  005274 G          553    1149#
L$LADP  002026 G          553#
L$LAST  020074 G          553    2482#
L$LOAD  002100 G          553#
L$LUN   002074 G          553#
L$MREV  002050 G          553#
L$NAME  002000 G          553#
L$PRIO  002042 G          553#
L$PROT  005370 G          553    1187#
L$PRT   002112 G          553#
L$REPP  002062 G          553#
L$REV   002010 G          553#
L$RPT   005272 G         1138#
L$SOFT  017456 G          553    2444#
L$SPC   002056 G          553#
L$SPCP  002020 G          553#
L$SPTP  002024 G          553#
L$STA   002030 G          553#
L$SW    002160 G          553     610#
L$TEST  002114 G          553#
L$TIML  002014 G          553#
L$UNIT  002012 G          553#
L10000  002156            587     601#
L10001  002260            610     653#
L10002  004000            812#
L10003  004046            817#
L10004  004114            822#
L10005  004162            827#
L10006  004204            831#
L10007  004226            835#
L10010  004250            839#
L10011  005272           1139#
L10012  005366           1185#
L10014  005376           1194#
L10015  005456           1220    1235#
L10016  006322           1263    1275    1287    1299    1309    1321    1333    1345    1361    1379    1383#
L10017  005516           1265#
L10020  005570           1277#
L10021  005642           1289#
L10022  005712           1301#
L10023  005752           1311#
L10024  006024           1323#
L10025  006074           1335#
L10026  006144           1347#
L10027  006226           1363#
L10030  006320           1381#
```

```
L10031  007210            1394    1403    1415    1428    1440    1452    1463    1474    1486    1502    1520    1523#
L10032  006374            1405#
L10033  006446            1417#
L10034  006520            1430#
L10035  006570            1442#
L10036  006640            1454#
L10037  006712            1465#
L10040  006762            1476#
L10041  007032            1488#
L10042  007114            1504#
L10043  007206            1522#
L10044  010604            1541    1574    1604    1619    1660#
L10045  007336            1555#
L10046  007420            1568#
L10047  007524            1587#
L10050  007606            1600#
L10051  007702            1618#
L10052  007714            1624#
L10053  007764            1631#
L10054  010032            1636#
L10055  010100            1641#
L10056  010146            1646#
L10057  010214            1651#
L10060  010754            1680    1697    1699#
L10061  011606            1723    1770    1787#
L10062  011404            1778#
L10063  014314            1826    1844    1940    2004#
L10064  012056            1835#
L10065  012160            1853#
L10066  012206            1860#
L10067  012276            1877#
L10070  012716            1936#
L10071  012752            1946#
L10072  013000            1950#
L10073  013026            1954#
L10074  013054            1958#
L10075  013102            1963#
L10076  017232            2034    2069    2215    2265    2268    2271    2274    2277    2335#
L10077  014566            2070#
L10100  015122            2113    2123#
L10101  015470            2175#
L10102  016034            2225#
L10103  016404            2275#
L10104  016464            2292#
L10105  016546            2299#
L10106  016600            2305#
L10107  017454            2404    2417    2432#
L10110  020020            2444    2454    2479#
MDHEDR  002000 G           536#
MEMTST  004666             949#   2092    2145    2198    2248
MESSG1  011441            1752    1781#
MESSG2  011454            1763    1782#
MISTAK  014174            1961    1997#
MORE    015034            2109#   2116    2119    2122
MSGOUT  015736            2207    2209#
MSG1    010216            1629    1653#
```

```
MSG2    010341            1634    1655#
MSG3    010415            1639    1656#
MSG4    010462            1644    1657#
MSG5    010532            1649    1658#
NEWLIN  011467            1768    1783#
NEXT    015764            2215#   2218    2221    2224
NODR    014246            1945    1953    1999#
NOERR   015020            2096    2106#
NONE    015372            2149    2159#
NONXT   016550 G          2120    2172    2222    2272    2301#
ONERR   003262             776#    815
OPTBL   013524            1921    1985#
OUTPUT  004634             919     932#
O$APTS= 000000             521#    553
O$AU  = 000000             521#    553
O$BGNR= 000000             521#    553
O$BGNS= 000001             521#    543#    553
O$DU  = 000000             521#    553
O$ERRT= 000000             521#    553
O$GNSW= 000001             521#    543#    553
O$POIN= 000001             521#    543#    553
O$SETU= 000000             521#    553    2482
PACR    002656             742#   1401    1413    1426    1438    1450    1461    1472    1484    1500    1518
PAGE    002314             707#    917*    918
PAGERR  004230 G           837#    928
PASCT   002310             705#   1211*   1678    1681*
PASS    002306             704#   1210*   1539    1802    2038    2109    2162
PASSED  015750            2202    2212#
PAX     017432            2415    2429#
PCR   = 177520             682#    917    1158*   1204*   1397*   1400    1408*   1409    1412    1421*   1422    1425    1433*
                          1434    1437    1445*   1446    1449    1456*   1457    1460    1467*   1468    1471    1479*   1480
                          1483    1491*   1492*   1493    1494    1498*   1507*   1508*   1509    1510    1513*   1813*   1857*
                          1872*   1884*   2087*   2106*   2140*   2159*   2193*   2212*   2243*   2262*
PGCT    016414            2180*   2196    2230*   2246    2280#
PNT   = 001000 G           673#
PNTR    013206            1894*   1897    1923*   1969#
PRI   = 002000 G           673#
PRIN    016300            2257    2259#
PRIOR   002326             712#   1152*   1570
PRIOUT  015360            2154    2156#
PRI00 = 000000 G           673#   1546    1559    1609
PRI01 = 000040 G           673#
PRI02 = 000100 G           673#
PRI03 = 000140 G           673#
PRI04 = 000200 G           673#
PRI05 = 000240 G           673#   1578
PRI06 = 000300 G           673#   1591
PRI07 = 000340 G           673#   1162    1544    1549    1562    1581    1594    1612
PRTSW   011022            1713    1724#
P1      014370            2043    2045#   2112
P2      014402            2046    2048#   2165
READN   011406            1746    1780#
REAL    002270             697#    949*    953*    966     968*    970*    979     981    2093    2146    2199    2249
REGDT   003670             790#    811     816     821     826    2298
RERR1   003734 G           809#   1261    1401
RERR2   004002 G           814#   1273    1413
```

```
RERR3   004050 G    819#  1285  1319  1426  1461
RERR4   004116 G    824#  1297  1307  1331  1343  1438  1450  1472  1484
RERR5   004164 G    829#  1359  1500
RERR6   004206 G    833#  1377  1518
RESPND  002334      715#  1207* 2054  2055  2057  2058  2061  2062  2065  2066  2179  2180  2181
                   2229  2230  2231
RFLAG   002300      701#   935  1820* 2088* 2142* 2194* 2244*
RKSW    017403     2414  2428#
ROTLP1  006166     1353# 1358
ROTLP2  006252     1369# 1375
ROTLP3  007054     1494# 1499
ROTLP4  007140     1510# 1516
ROTO    003504      784#  834
ROT1    003434      782#  830
RSET    002336      716# 1206* 1804  1805
RSTRT   011710     1803  1808  1812#
RWDCT   016711     2127  2179  2229  2313#
RWR     002612      740# 1261  1273  1285  1297  1307  1319  1331  1343  1359  1377
RWREG = 177522     1205* 1252# 1257* 1260  1268* 1269  1272  1280* 1281  1284  1292* 1293  1296
                   1304* 1305  1314* 1315  1318  1326* 1327  1330  1338* 1339  1342  1350* 1351*
                   1352  1353  1357* 1366* 1367* 1368  1369  1372*
SERR1   011472     1777  1784#
SETADR  005144     1007# 1810  2083  2136  2189  2239
SFPTBL  002160 G    610# 1819  1894  1914
SRR     017150     2184  2329#
STORE   002322      710#  893   894  1007  1809  2082  2135  2188  2238
STRT    011646     1801  1807#
SVCGBL= 000000      521#  523#  536   553   569   570   587   610   672   692   760   761   809
                    814   819   824   829   833   837  1138  1149  1187  1193  1202  1622  1628
                   1633  1638  1643  1648  1776  1944  1948  1952  1956  1960  2288  2294  2301
                   2404  2444  2482#
SVCINS= 000000      521#  522#  553   570   587   610   760   761   810   811   812   815   816
                    817   820   821   822   825   826   827   830   831   834   835   838   839
                    843   892   893   928   929  1139  1150  1162  1185  1194  1212  1220  1235
                   1256  1261  1262  1263  1264  1265  1267  1273  1274  1275  1276  1277  1279
                   1285  1286  1287  1288  1289  1291  1297  1298  1299  1300  1301  1303  1307
                   1308  1309  1310  1311  1313  1319  1320  1321  1322  1323  1325  1331  1332
                   1333  1334  1335  1337  1343  1344  1345  1346  1347  1349  1359  1360  1361
                   1362  1363  1365  1377  1378  1379  1380  1381  1383  1394  1396  1401  1402
                   1403  1404  1405  1407  1413  1414  1415  1416  1417  1420  1426  1427  1428
                   1429  1430  1432  1438  1439  1440  1441  1442  1444  1450  1451  1452  1453
                   1454  1455  1461  1462  1463  1464  1465  1466  1472  1473  1474  1475  1476
                   1478  1484  1485  1486  1487  1488  1490  1500  1501  1502  1503  1504  1506
                   1518  1519  1520  1521  1522  1523  1541  1543  1544  1546  1549  1552  1553
                   1555  1557  1559  1562  1565  1566  1568  1574  1576  1578  1581  1584  1585
                   1587  1589  1591  1594  1597  1598  1600  1604  1606  1608  1609  1612  1615
                   1616  1618  1619  1624  1629  1630  1631  1634  1635  1636  1639  1640  1641
                   1644  1645  1646  1649  1650  1651  1660  1672  1676  1677  1680  1685  1689
                   1693  1697  1699  1712  1718  1721  1722  1723  1746  1752  1763  1768  1770
                   1777  1778  1787  1799  1800  1801  1804  1809  1824  1825  1826  1827  1833
                   1834  1835  1838  1842  1843  1844  1845  1851  1852  1853  1855  1860  1864
                   1877  1881  1891  1906  1910  1912  1921  1926  1927  1928  1929  1930  1933
                   1936  1940  1945  1946  1949  1950  1953  1954  1957  1958  1961  1963  2004
                   2031  2034  2035  2036  2051  2054  2057  2061  2065  2069  2070  2073  2078
                   2082  2113  2114  2115  2117  2118  2120  2121  2123  2125  2127  2131  2135
                   2166  2167  2169  2170  2172  2173  2175  2177  2179  2184  2188  2215  2216
```

```
                    2217    2219    2220    2222    2223    2225    2227    2229    2234    2238    2265    2266    2267
                    2268    2269    2270    2271    2272    2273    2274    2275    2277    2289    2292    2295    2298
                    2299    2302    2305    2335    2404    2411    2412    2413    2414    2415    2417    2432    2444
                    2445    2446    2447    2448    2449    2450    2451    2452    2454    2479    2482
SVCSUB= 177777       521#    1256    1267    1279    1291    1303    1313    1325    1337    1349    1365    1396    1407
                    1420    1432    1444    1455    1466    1478    1490    1506    1543    1557    1576    1589    1606
                    1799    1838    1855    1864    1881    2031    2073    2125    2177    2227
SVCTAG= 000000       521#    524#     601     653     812     817     822     827     831     835     839     893    1139
                    1185    1194    1235    1265    1277    1289    1301    1311    1323    1335    1347    1363    1381
                    1383    1405    1417    1430    1442    1454    1465    1476    1488    1504    1522    1523    1555
                    1568    1587    1600    1618    1624    1631    1636    1641    1646    1651    1660    1699    1778
                    1787    1804    1809    1835    1853    1860    1877    1936    1946    1950    1954    1958    1963
                    2004    2051    2054    2057    2061    2065    2070    2078    2082    2123    2127    2131    2135
                    2175    2179    2184    2188    2225    2229    2234    2238    2275    2292    2299    2305    2335
                    2432    2479
SVCTST= 177777       521#    1254    1390    1535    1667    1710    1797    2029
SWCHON  011352      1725*   1734*   1736*   1738*   1743*   1744*   1745*   1746    1748    1774#
SWCNT   011346      1726*   1729*   1740*   1772#
SWERR   011354 G    1721    1776#
SWSET   002320       709#    1153*   1716*   1717    1777
SYEE    017200      2234    2331#
SYETST  016224      2247#   2264
SYRTST  015662      2197#   2214
SYSE    017066      2065    2266    2269    2272    2323#
SYSEIN  014534      2063    2065#
SYSET   016040      2068    2228#
SYSR    017053      2061    2216    2219    2222    2321#
SYSRIN  014506      2059    2061#   2164
SYSROM  002412       724#    2182    2195    2232    2245
SYSRT   015474      2064    2178#
S$LSYM= 010000       521#     601#    653#    812#    817#    822#    827#    831#    835#    839#    893#   1139#   1185#
                    1194#   1235#   1265#   1277#   1289#   1301#   1311#   1323#   1335#   1347#   1363#   1381#   1383#
                    1405#   1417#   1430#   1442#   1454#   1465#   1476#   1488#   1504#   1522#   1523#   1555#   1568#
                    1587#   1600#   1618#   1624#   1631#   1636#   1641#   1646#   1651#   1660#   1699#   1778#   1787#
                    1804#   1809#   1835#   1853#   1860#   1877#   1936#   1946#   1950#   1954#   1958#   1963#   2004#
                    2051#   2054#   2057#   2061#   2065#   2070#   2078#   2082#   2123#   2127#   2131#   2135#   2175#
                    2179#   2184#   2188#   2225#   2229#   2234#   2238#   2275#   2292#   2299#   2305#   2335#   2432#
                    2479#
TABLES  013204      1893    1968#
TABL1   013604      1906    1987#
TABL2   013703      1910    1989#
TABL3   014002      1912    1991#
TAG1    011204      1750#   1757
TAG2    011234      1751    1753#
TAG3    011260      1761#   1767
TAG4    011310      1762    1764#
TAG4A   011322      1759    1768#
TEMP    011350      1724*   1730    1739*   1773#
TSTCKW  005044       965     975     979#
T$ARGC= 000001       553#    810#    811#    815#    816#    820#    821#    825#    826#    830#    834#    838#    843#
                     892#   1629#   1630#   1634#   1635#   1639#   1640#   1644#   1645#   1649#   1650#   1746#   1752#
                    1763#   1768#   1777#   1891#   1906#   1910#   1912#   1921#   1930#   1933#   1945#   1949#   1953#
                    1957#   1961#   2289#   2295#   2298#   2302#
T$CODE= 111004       893#   1804#   1809#   2051#   2054#   2057#   2061#   2065#   2078#   2082#   2127#   2131#   2135#
                    2179#   2184#   2188#   2229#   2234#   2238#   2411#   2412#   2413#   2414#   2415#   2417#   2445#
                    2446#   2447#   2448#   2449#   2450#   2451#   2452#   2454#
```

```
TSERRN= 000062   521#  928#  1261#  1273#  1285#  1297#  1307#  1319#  1331#  1343#  1359#  1377#  1401#
                1413#  1426#  1438#  1450#  1461#  1472#  1484#  1500#  1518#  1552#  1565#  1584#  1597#
                1615#  1721#  1824#  1833#  1842#  1851#  1928#  2114#  2117#  2120#  2166#  2169#  2172#
                2216#  2219#  2222#  2266#  2269#  2272#
TSEXCP= 000000   893#  1809#  2082#  2127#  2135#  2179#  2188#  2229#  2238#  2411#  2412#  2413#  2414#
                2445#  2446#  2447#  2448#  2449#  2450#  2451#  2452#
TSFLAG= 000041  1220#  1263#  1275#  1287#  1299#  1309#  1321#  1333#  1345#  1361#  1379#  1394#  1403#
                1415#  1428#  1440#  1452#  1463#  1474#  1486#  1502#  1520#  1541#  1574#  1604#  1619#
                1680#  1697#  1723#  1770#  1826#  1844#  1940#  2034#  2069#  2113#  2215#  2265#  2268#
                2271#  2274#  2277#  2417#  2454#
TSGMAN= 000000   521#  893#  1809#  2082#  2127#  2135#  2179#  2188#  2229#  2238#
TSHILI= 177777   893#  1809#  2082#  2127#  2135#  2179#  2188#  2229#  2238#  2411#  2412#  2413#  2414#
                2445#  2446#  2447#  2448#  2449#  2450#  2451#  2452#
TSLAST= 000001   521#  2482#
TSLOLI= 000000   893#  1809#  2082#  2127#  2135#  2179#  2188#  2229#  2238#  2411#  2412#  2413#  2414#
                2445#  2446#  2447#  2448#  2449#  2450#  2451#  2452#
TSLSYM= 010000   521#  601  653  812  817  822  827  831  835  839  1139  1185  1194
                1235  1265  1277  1289  1301  1311  1323  1335  1347  1363  1381  1383  1405
                1417  1430  1442  1454  1465  1476  1488  1504  1522  1523  1555  1568  1587
                1600  1618  1624  1631  1636  1641  1646  1651  1660  1699  1778  1787  1835
                1853  1860  1877  1936  1946  1950  1954  1958  1963  2004  2070  2123  2175
                2225  2275  2292  2299  2305  2335  2432  2479
TSLTNO= 000007   2482#
TSNEST= 177777   521#  536#  554#  569#  571#  587#  601#  610#  653#  672#  684#  692#  725#
                809#  812#  814#  817#  819#  822#  824#  827#  829#  831#  833#  835#  837#
                839#  1138#  1139#  1149#  1185#  1187#  1191#  1193#  1194#  1202#  1235#  1254#  1256#
                1265#  1267#  1277#  1279#  1289#  1291#  1301#  1303#  1311#  1313#  1323#  1325#  1335#
                1337#  1347#  1349#  1363#  1365#  1381#  1383#  1390#  1396#  1405#  1407#  1417#  1420#
                1430#  1432#  1442#  1444#  1454#  1455#  1465#  1466#  1476#  1478#  1488#  1490#  1504#
                1506#  1522#  1523#  1535#  1543#  1555#  1557#  1568#  1576#  1587#  1589#  1600#  1606#
                1618#  1622#  1624#  1628#  1631#  1633#  1636#  1638#  1641#  1643#  1646#  1648#  1651#
                1660#  1667#  1699#  1710#  1776#  1778#  1787#  1797#  1799#  1835#  1838#  1853#  1855#
                1860#  1864#  1877#  1881#  1936#  1944#  1946#  1948#  1950#  1952#  1954#  1956#  1958#
                1960#  1963#  2004#  2029#  2031#  2070#  2073#  2123#  2125#  2175#  2177#  2225#  2227#
                2275#  2288#  2292#  2294#  2299#  2301#  2305#  2335#  2404#  2417  2432#  2444#  2454
                2479#
TSNSO = 000005   536#  554  569#  571  587#  601  610#  653  672#  684  692#  725  809#
                812  814#  817  819#  822  824#  827  829#  831  833#  835  837#  839
                1138#  1139  1149#  1185  1187#  1191  1193#  1194  1202#  1235  1254#  1383  1390#
                1523  1535#  1660  1667#  1699  1710#  1787  1797#  2004  2029#  2335  2404#  2417
                2432  2444#  2454  2479
TSNS1 = 000011   1256#  1265  1267#  1277  1279#  1289  1291#  1301  1303#  1311  1313#  1323  1325#
                1335  1337#  1347  1349#  1363  1365#  1381  1396#  1405  1407#  1417  1420#  1430
                1432#  1442  1444#  1454  1455#  1465  1466#  1476  1478#  1488  1490#  1504  1506#
                1522  1543#  1555  1557#  1568  1576#  1587  1589#  1600  1606#  1618  1622#  1624
                1628#  1631  1633#  1636  1638#  1641  1643#  1646  1648#  1651  1776#  1778  1799#
                1835  1838#  1853  1855#  1860  1864#  1877  1881#  1936  1944#  1946  1948#  1950
                1952#  1954  1956#  1958  1960#  1963  2031#  2070  2073#  2123  2125#  2175  2177#
                2225  2227#  2275  2288#  2292  2294#  2299  2301#  2305
TSPTNU= 000000   521#
TSSAVL= 177777   521#
TSSEGL= 177777   521#
TSSUBN= 000005   521#  1254#  1256#  1267#  1279#  1291#  1303#  1313#  1325#  1337#  1349#  1365#  1390#
                1396#  1407#  1420#  1432#  1444#  1455#  1466#  1478#  1490#  1506#  1535#  1543#  1557#
                1576#  1589#  1606#  1667#  1710#  1797#  1799#  1838#  1855#  1864#  1881#  2029#  2031#
                2073#  2125#  2177#  2227#
```

```
TSTAGL= 177777   521#
TSTAGN= 010111   521#  587#  610#  809#  814#  819#  824#  829#  833#  837#  1138#  1149#  1187#
                1193#  1202#  1254#  1256#  1267#  1279#  1291#  1303#  1313#  1325#  1337#  1349#  1365#
                1390#  1396#  1407#  1420#  1432#  1444#  1455#  1466#  1478#  1490#  1506#  1535#  1543#
                1557#  1576#  1589#  1606#  1622#  1628#  1633#  1638#  1643#  1648#  1667#  1710#  1776#
                1797#  1799#  1838#  1855#  1864#  1881#  1944#  1948#  1952#  1956#  1960#  2029#  2031#
                2073#  2125#  2177#  2227#  2288#  2294#  2301#  2404#  2444#
TSTEMP= 000005   554#  570#  571#  601#  653#  684#  725#  812#  817#  822#  827#  831#  835#
                839#  893#  1139#  1185#  1191#  1194#  1220#  1235#  1263#  1265#  1275#  1277#  1287#
                1289#  1299#  1301#  1309#  1311#  1321#  1323#  1333#  1335#  1345#  1347#  1361#  1363#
                1379#  1381#  1383#  1394#  1403#  1405#  1415#  1417#  1428#  1430#  1440#  1442#  1452#
                1454#  1463#  1465#  1474#  1476#  1486#  1488#  1502#  1504#  1520#  1522#  1523#  1541#
                1555#  1568#  1574#  1587#  1600#  1604#  1618#  1619#  1624#  1631#  1636#  1641#  1646#
                1651#  1660#  1680#  1697#  1699#  1723#  1770#  1778#  1787#  1804#  1809#  1826#  1835#
                1844#  1853#  1860#  1877#  1936#  1940#  1946#  1950#  1954#  1958#  1963#  2004#  2034#
                2051#  2054#  2057#  2061#  2065#  2069#  2070#  2078#  2082#  2113#  2123#  2127#  2131#
                2135#  2175#  2179#  2184#  2188#  2215#  2225#  2229#  2234#  2238#  2265#  2268#  2271#
                2274#  2275#  2277#  2292#  2299#  2305#  2335#  2411#  2412#  2413#  2414#  2415#  2417#
                2432#  2445#  2446#  2447#  2448#  2449#  2450#  2451#  2452#  2454#  2479#
TSTEST= 000007   521#  1254#  1256  1267  1279  1291  1303  1313  1325  1337  1349  1365  1390#
                1396  1407  1420  1432  1444  1455  1466  1478  1490  1506  1535#  1543  1557
                1576  1589  1606  1667#  1710#  1797#  1799  1838  1855  1864  1881  2029#  2031
                2073  2125  2177  2227  2482
TSTSTM= 177777   521#  810  811  812  815  816  817  820  821  822  825  826  827
                830  831  834  835  838  839  843  892  893  928  929  1139  1150
                1162  1185  1194  1212  1220  1235  1256  1261  1262  1263  1264  1265  1267
                1273  1274  1275  1276  1277  1279  1285  1286  1287  1288  1289  1291  1297
                1298  1299  1300  1301  1303  1307  1308  1309  1310  1311  1313  1319  1320
                1321  1322  1323  1325  1331  1332  1333  1334  1335  1337  1343  1344  1345
                1346  1347  1349  1359  1360  1361  1362  1363  1365  1377  1378  1379  1380
                1381  1383  1394  1396  1401  1402  1403  1404  1405  1407  1413  1414  1415
                1416  1417  1420  1426  1427  1428  1429  1430  1432  1438  1439  1440  1441
                1442  1444  1450  1451  1452  1453  1454  1455  1461  1462  1463  1464  1465
                1466  1472  1473  1474  1475  1476  1478  1484  1485  1486  1487  1488  1490
                1500  1501  1502  1503  1504  1506  1518  1519  1520  1521  1522  1523  1541
                1543  1544  1546  1549  1552  1553  1555  1557  1559  1562  1565  1566  1568
                1574  1576  1578  1581  1584  1585  1587  1589  1591  1594  1597  1598  1600
                1604  1606  1608  1609  1612  1615  1616  1618  1619  1629  1630  1631  1634
                1635  1636  1639  1640  1641  1644  1645  1646  1649  1650  1651  1660  1672
                1676  1680  1685  1689  1693  1697  1699  1712  1721  1722  1723  1746  1752
                1763  1768  1770  1777  1778  1787  1799  1800  1804  1809  1824  1825  1826
                1827  1833  1834  1835  1838  1842  1843  1844  1845  1851  1852  1853  1855
                1860  1864  1877  1881  1891  1906  1910  1912  1921  1926  1928  1929  1930
                1933  1936  1940  1945  1946  1949  1950  1953  1954  1957  1958  1961  1963
                2004  2031  2034  2035  2051  2054  2057  2061  2065  2069  2070  2073  2078
                2082  2113  2114  2115  2117  2118  2120  2121  2123  2125  2127  2131  2135
                2166  2167  2169  2170  2172  2173  2175  2177  2179  2184  2188  2215  2216
                2217  2219  2220  2222  2223  2225  2227  2229  2234  2238  2265  2266  2267
                2268  2269  2270  2271  2272  2273  2274  2275  2277  2289  2292  2295  2298
                2299  2302  2305  2335
TSTSTS= 000001   521#  1254#  1390#  1535#  1667#  1710#  1797#  2029#
TSSAUT= 010014   1193#  1194
TSSCLE= 010015   1202#  1220  1235
TSSHAR= 010107   2404#  2417  2432
TSSHW = 010000   587#  601
TSSINI= 010012   1149#  1185
```

```
T$$MSG= 010106          809#    812     814#    817     819#    822     824#    827     829#    831     833#    835     837#
                        839     1628#   1631    1633#   1636    1638#   1641    1643#   1646    1648#   1651    1776#   1778
                        1944#   1946    1948#   1950    1952#   1954    1956#   1958    1960#   1963    2288#   2292    2294#
                        2299    2301#   2305
T$$PRO= 010013          1187#
T$$RPT= 010011          1138#   1139
T$$SOF= 010110          2444#   2454    2479
T$$SRV= 010052          1622#   1624
T$$SUB= 010103          1256#   1265    1267#   1277    1279#   1289    1291#   1301    1303#   1311    1313#   1323    1325#
                        1335    1337#   1347    1349#   1363    1365#   1381    1396#   1405    1407#   1417    1420#   1430
                        1432#   1442    1444#   1454    1455#   1465    1466#   1476    1478#   1488    1490#   1504    1506#
                        1522    1543#   1555    1557#   1568    1576#   1587    1589#   1600    1606#   1618    1799#   1835
                        1838#   1853    1855#   1860    1864#   1877    1881#   1936    2031#   2070    2073#   2113    2123
                        2125#   2175    2177#   2225    2227#   2275
T$$SW = 010001           610#    653
T$$TES= 010076          1254#   1263    1275    1287    1299    1309    1321    1333    1345    1361    1379    1383    1390#
                        1394    1403    1415    1428    1440    1452    1463    1474    1486    1502    1520    1523    1535#
                        1541    1574    1604    1619    1660    1667#   1680    1697    1699    1710#   1723    1770    1787
                        1797#   1826    1844    1940    2004    2029#   2034    2069    2215    2265    2268    2271    2274
                        2277    2335
T1      005460 G         570    1254#
T1.1    005460          1256#
T1.10   006230          1365#
T1.2    005520          1267#
T1.3    005572          1279#
T1.4    005644          1291#
T1.5    005714          1303#
T1.6    005754          1313#
T1.7    006026          1325#
T1.8    006076          1337#
T1.9    006146          1349#
T2      006324 G         570    1390#
T2.1    006336          1396#
T2.10   007116          1506#
T2.2    006376          1407#
T2.3    006450          1420#
T2.4    006522          1432#
T2.5    006572          1444#
T2.6    006642          1455#
T2.7    006714          1466#
T2.8    006764          1478#
T2.9    007034          1490#
T3      007212 G         570    1535#
T3.1    007230          1543#
T3.2    007340          1557#
T3.3    007444          1576#
T3.4    007526          1589#
T3.5    007622          1606#
T4      010606 G         570    1667#
T5      010756 G         570    1710#
T6      011610 G         570    1797#
T6.1    011610          1799#
T6.2    012060          1838#
T6.3    012162          1855#
T6.4    012210          1864#
T6.5    012300          1881#
```

```
T7      014316 G      570    2029#
T7.1    014316       2031#
T7.2    014570       2073#
T7.3    015124       2125#
T7.4    015472       2177#
T7.5    016036       2227#
UAM   = 000200 G      673#
ULIMIT  002312        706#    916*    918     920     922*    925*    926
UNIT    017316       2411    2425#
UNKNWN  014101       1930    1993#
VECT    002316        708#   1151*   1212    1544
VIPRI   004252        843#   2291    2297    2304
VIRMSG  003627        788#    843
VIRTAD  004526        915#   1962    2097    2150    2203    2253    2290    2296    2303
VRTPCR  002264        695#   1812*   1813    1856*   1857    1866*   1872    1874*
WDELAY  005234       1043#   1547    1560    1579    1592    1610    1670    1674    1683    1687    1691    1695
WORD    016426       2127    2128    2141    2285#
WORDCT  002324        711#    895*   2075*   2128*   2181*   2231*
XSALWA= 000000        521#   2417    2454
XSFALS= 000040        521#
XSOFFS= 000400        521#   2417    2454
XSTRUE= 000020        521#
ZERR    003216        774#    810
.     = 020074          3#    622#    722#    723#    724#   1220    1263    1275    1287    1299    1309    1321    1333
                     1345    1361    1379    1394    1403   1415    1428    1440    1452    1463    1474    1486    1502
                     1520    1541    1574    1604    1619   1680    1697    1723    1770    1786#   1826    1844    1940
                     1966#   2003#   2034    2069    2113   2215    2265    2268    2271    2274    2277    2417    2454
                     2470#   2481#
```

BCOMPL 1677 1713 1927
BGNAUT 1193
BGNCLN 1202
BGNHRD 2404
BGNHW 587
BGNINI 1149
BGNMOD 536 569 672 692
BGNMSG 809 814 819 824 829 833 837 1628 1633 1638 1643 1648 1776 1944 1948
1952 1956 1960 2288 2294 2301
BGNPRO 1187
BGNRPT 1138
BGNSFT 2444
BGNSRV 1622
BGNSUB 1256 1267 1279 1291 1303 1313 1325 1337 1349 1365 1396 1407 1420 1432 1444
1455 1466 1478 1490 1506 1543 1557 1576 1589 1606 1799 1838 1855 1864 1881
2031 2073 2125 2177 2227
BGNSW 610
BGNTST 1254 1390 1535 1667 1710 1797 2029
BNCOMP 1801 2036
BREAK 1672 1685 1689 1693
BRESET 1608
CKLOOP 929 1262 1264 1274 1276 1286 1288 1298 1300 1308 1310 1320 1322 1332 1334
1344 1346 1360 1362 1378 1380 1402 1404 1414 1416 1427 1429 1439 1441 1451
1453 1462 1464 1473 1475 1485 1487 1501 1503 1519 1521 1553 1566 1585 1598
1616 1722 1825 1827 1834 1843 1845 1852 1929 2115 2118 2121 2167 2170 2173
2217 2220 2223 2267 2270 2273
CLRVEC 1212
DESCRI 760
DEVTYP 761
DISPAT 570
ENDAUT 1194
ENDCLN 1235
ENDHRD 2432
ENDHW 601
ENDINI 1185
ENDMOD 554 571 684 725
ENDMSG 812 817 822 827 831 835 839 1631 1636 1641 1646 1651 1778 1946 1950
1954 1958 1963 2292 2299 2305
ENDPRO 1191
ENDRPT 1139
ENDSFT 2479
ENDSRV 1624
ENDSUB 1265 1277 1289 1301 1311 1323 1335 1347 1363 1381 1405 1417 1430 1442 1454
1465 1476 1488 1504 1522 1555 1568 1587 1600 1618 1835 1853 1860 1877 1936
2070 2123 2175 2225 2275
ENDSW 653
ENDTST 1383 1523 1660 1699 1787 2004 2335
EQUALS 673
ERRDF 928 1261 1273 1285 1297 1307 1319 1331 1343 1359 1377 1401 1413 1426 1438
1450 1461 1472 1484 1500 1518 1552 1565 1584 1597 1615 1721 1824 1833 1842
1851 1928 2114 2117 2120 2166 2169 2172 2216 2219 2222 2266 2269 2272
EXIT 1220 1263 1275 1287 1299 1309 1321 1333 1345 1361 1379 1394 1403 1415 1428
1440 1452 1463 1474 1486 1502 1520 1541 1574 1604 1619 1680 1697 1723 1770
1826 1844 1940 2034 2069 2113 2215 2265 2268 2271 2274 2277 2417 2454
GMANID 893 1809 2082 2127 2135 2179 2188 2229 2238
GMANIL 1804 2051 2054 2057 2061 2065 2078 2131 2184 2234

GPHARD 1150
GPRMD 893# 1809# 2082# 2127# 2135# 2179# 2188# 2229# 2238# 2411 2412 2413 2414 2445 2446
2447 2448 2449 2450 2451 2452
GPRML 1804# 2051# 2054# 2057# 2061# 2065# 2078# 2131# 2184# 2234# 2415
HEADER 553
LASTAD 2482
MANUAL 1676 1712 1800 1926 2035
MSBYTE 553#
MSCHEC 1220# 1263# 1275# 1287# 1299# 1309# 1321# 1333# 1345# 1361# 1379# 1394# 1403# 1415# 1428#
1440# 1452# 1463# 1474# 1486# 1502# 1520# 1541# 1574# 1604# 1619# 1680# 1697# 1723# 1770#
1826# 1844# 1940# 2034# 2069# 2113# 2215# 2265# 2268# 2271# 2274# 2277# 2417# 2454#
MSCNTO 893# 1804# 1809# 2051# 2054# 2057# 2061# 2065# 2078# 2082# 2127# 2131# 2135# 2179# 2184#
2188# 2229# 2234# 2238# 2411# 2412# 2413# 2414# 2415# 2445# 2446# 2447# 2448# 2449# 2450#
2451# 2452#
MSCOUN 810# 811# 815# 816# 820# 821# 825# 826# 830# 834# 838# 843# 892# 1629# 1630#
1634# 1635# 1639# 1640# 1644# 1645# 1649# 1650# 1746# 1752# 1763# 1768# 1777# 1891# 1906#
1910# 1912# 1921# 1930# 1933# 1945# 1949# 1953# 1957# 1961# 2289# 2295# 2298# 2302#
MSDATA 553# 760# 761#
MSDECR 554# 571# 601# 653# 684# 725# 812# 817# 822# 827# 831# 835# 839# 1139# 1185#
1191# 1194# 1235# 1265# 1277# 1289# 1301# 1311# 1323# 1335# 1347# 1363# 1381# 1383# 1405#
1417# 1430# 1442# 1454# 1465# 1476# 1488# 1504# 1522# 1523# 1555# 1568# 1587# 1600# 1618#
1624# 1631# 1636# 1641# 1646# 1651# 1660# 1699# 1778# 1787# 1835# 1853# 1860# 1877# 1936#
1946# 1950# 1954# 1958# 1963# 2004# 2070# 2123# 2175# 2225# 2275# 2292# 2299# 2305# 2335#
2432# 2479#
MSDEFA 893# 1804# 1809# 2051# 2054# 2057# 2061# 2065# 2078# 2082# 2127# 2131# 2135# 2179# 2184#
2188# 2229# 2234# 2238# 2411# 2412# 2413# 2414# 2415# 2445# 2446# 2447# 2448# 2449# 2450#
2451# 2452#
MSENDE 554# 571# 601# 653# 684# 725# 812# 817# 822# 827# 831# 835# 839# 1139# 1185#
1194# 1235# 1265# 1277# 1289# 1301# 1311# 1323# 1335# 1347# 1363# 1381# 1383# 1405# 1417#
1430# 1442# 1454# 1465# 1476# 1488# 1504# 1522# 1523# 1555# 1568# 1587# 1600# 1618# 1624#
1631# 1636# 1641# 1646# 1651# 1660# 1699# 1778# 1787# 1835# 1853# 1860# 1877# 1936# 1946#
1950# 1954# 1958# 1963# 2004# 2070# 2123# 2175# 2225# 2275# 2292# 2299# 2305# 2335# 2432#
2479#
MSERRI 928# 1261# 1273# 1285# 1297# 1307# 1319# 1331# 1343# 1359# 1377# 1401# 1413# 1426# 1438#
1450# 1461# 1472# 1484# 1500# 1518# 1552# 1565# 1584# 1597# 1615# 1721# 1824# 1833# 1842#
1851# 1928# 2114# 2117# 2120# 2166# 2169# 2172# 2216# 2219# 2222# 2266# 2269# 2272#
MSEXCP 893# 1809# 2082# 2127# 2135# 2179# 2188# 2229# 2238# 2411# 2412# 2413# 2414# 2445# 2446#
2447# 2448# 2449# 2450# 2451# 2452#
MSEXIT 1220# 1263# 1275# 1287# 1299# 1309# 1321# 1333# 1345# 1361# 1379# 1394# 1403# 1415# 1428#
1440# 1452# 1463# 1474# 1486# 1502# 1520# 1541# 1574# 1604# 1619# 1680# 1697# 1723# 1770#
1826# 1844# 1940# 2034# 2069# 2113# 2215# 2265# 2268# 2271# 2274# 2277# 2417# 2454#
MSEXSE 1220# 1263# 1275# 1287# 1299# 1309# 1321# 1333# 1345# 1361# 1379# 1394# 1403# 1415# 1428#
1440# 1452# 1463# 1474# 1486# 1502# 1520# 1541# 1574# 1604# 1619# 1680# 1697# 1723# 1770#
1826# 1844# 1940# 2034# 2069# 2113# 2215# 2265# 2268# 2271# 2274# 2277# 2417# 2454#
MSEXTJ 1220# 1263# 1275# 1287# 1299# 1309# 1321# 1333# 1345# 1361# 1379# 1394# 1403# 1415# 1428#
1440# 1452# 1463# 1474# 1486# 1502# 1520# 1541# 1574# 1604# 1619# 1680# 1697# 1723# 1770#
1826# 1844# 1940# 2034# 2069# 2113# 2215# 2265# 2268# 2271# 2274# 2277# 2417# 2454#
MSGEN 536# 553# 569# 570# 587# 601# 610# 653# 672# 692# 760# 761# 809# 812# 814#
817# 819# 822# 824# 827# 829# 831# 833# 835# 837# 839# 893# 1138# 1139# 1149#
1185# 1187# 1193# 1194# 1202# 1235# 1254# 1256# 1265# 1267# 1277# 1279# 1289# 1291# 1301#
1303# 1311# 1313# 1323# 1325# 1335# 1337# 1347# 1349# 1363# 1365# 1381# 1383# 1390# 1396#
1405# 1407# 1417# 1420# 1430# 1432# 1442# 1444# 1454# 1455# 1465# 1466# 1476# 1478# 1488#
1490# 1504# 1506# 1522# 1523# 1535# 1543# 1555# 1557# 1568# 1576# 1587# 1589# 1600# 1606#
1618# 1622# 1624# 1628# 1631# 1633# 1636# 1638# 1641# 1643# 1646# 1648# 1651# 1660# 1667#
1699# 1710# 1776# 1778# 1787# 1797# 1799# 1804# 1809# 1835# 1838# 1853# 1855# 1860# 1864#
1877# 1881# 1936# 1944# 1946# 1948# 1950# 1952# 1954# 1956# 1958# 1960# 1963# 2004# 2029#

```
                2031#  2051#  2054#  2057#  2061#  2065#  2070#  2073#  2078#  2082#  2123#  2125#  2127#  2131#  2135#
                2175#  2177#  2179#  2184#  2188#  2225#  2227#  2229#  2234#  2238#  2275#  2288#  2292#  2294#  2299#
                2301#  2305#  2335#  2404#  2432#  2444#  2479#  2482#
MSGENB           893#  1804#  1809#  2051#  2054#  2057#  2061#  2065#  2078#  2082#  2127#  2131#  2135#  2179#  2184#
                2188#  2229#  2234#  2238#
MSGETS           554#   571#   601#   653#   684#   725#   812#   817#   822#   827#   831#   835#   839#  1139#  1185#
                1191#  1194#  1235#  1265#  1277#  1289#  1301#  1311#  1323#  1335#  1347#  1363#  1381#  1383#  1405#
                1417#  1430#  1442#  1454#  1465#  1476#  1488#  1504#  1522#  1523#  1555#  1568#  1587#  1600#  1618#
                1624#  1631#  1636#  1641#  1646#  1651#  1660#  1699#  1778#  1787#  1835#  1853#  1860#  1877#  1936#
                1946#  1950#  1954#  1958#  1963#  2004#  2070#  2123#  2175#  2225#  2275#  2292#  2299#  2305#  2335#
                2417#  2432#  2454#  2479#
MSGETT          1220#  1263#  1275#  1287#  1299#  1309#  1321#  1333#  1345#  1361#  1379#  1394#  1403#  1415#  1428#
                1440#  1452#  1463#  1474#  1486#  1502#  1520#  1541#  1574#  1604#  1619#  1680#  1697#  1723#  1770#
                1826#  1844#  1940#  2034#  2069#  2113#  2215#  2265#  2268#  2271#  2274#  2277#  2417#  2454#
MSGNGB           536#   553#   569#   570#   587#   610#   672#   692#   760#   761#   809#   814#   819#   824#   829#
                 833#   837#  1138#  1149#  1187#  1193#  1202#  1622#  1628#  1633#  1638#  1643#  1648#  1776#  1944#
                1948#  1952#  1956#  1960#  2288#  2294#  2301#  2404#  2444#  2482#
MSGNIN           553#   570#   587#   610#   760#   761#   810#   811#   812#   815#   816#   817#   820#   821#   822#
                 825#   826#   827#   830#   831#   834#   835#   838#   839#   843#   892#   893#   928#   929#  1139#
                1150#  1162#  1185#  1194#  1212#  1220#  1235#  1256#  1261#  1262#  1263#  1264#  1265#  1267#  1273#
                1274#  1275#  1276#  1277#  1279#  1285#  1286#  1287#  1288#  1289#  1291#  1297#  1298#  1299#  1300#
                1301#  1303#  1307#  1308#  1309#  1310#  1311#  1313#  1319#  1320#  1321#  1322#  1323#  1325#  1331#
                1332#  1333#  1334#  1335#  1337#  1343#  1344#  1345#  1346#  1347#  1349#  1359#  1360#  1361#  1362#
                1363#  1365#  1377#  1378#  1379#  1380#  1381#  1383#  1394#  1396#  1401#  1402#  1403#  1404#  1405#
                1407#  1413#  1414#  1415#  1416#  1417#  1420#  1426#  1427#  1428#  1429#  1430#  1432#  1438#  1439#
                1440#  1441#  1442#  1444#  1450#  1451#  1452#  1453#  1454#  1455#  1461#  1462#  1463#  1464#  1465#
                1466#  1472#  1473#  1474#  1475#  1476#  1478#  1484#  1485#  1486#  1487#  1488#  1490#  1500#  1501#
                1502#  1503#  1504#  1506#  1518#  1519#  1520#  1521#  1522#  1523#  1541#  1543#  1544#  1546#  1549#
                1552#  1553#  1555#  1557#  1559#  1562#  1565#  1566#  1568#  1574#  1576#  1578#  1581#  1584#  1585#
                1587#  1589#  1591#  1594#  1597#  1598#  1600#  1604#  1606#  1608#  1609#  1612#  1615#  1616#  1618#
                1619#  1624#  1629#  1630#  1631#  1634#  1635#  1636#  1639#  1640#  1641#  1644#  1645#  1646#  1649#
                1650#  1651#  1660#  1672#  1676#  1677#  1680#  1685#  1689#  1693#  1697#  1699#  1712#  1713#  1721#
                1722#  1723#  1746#  1752#  1763#  1768#  1770#  1777#  1778#  1787#  1799#  1800#  1801#  1804#  1809#
                1824#  1825#  1826#  1827#  1833#  1834#  1835#  1838#  1842#  1843#  1844#  1845#  1851#  1852#  1853#
                1855#  1860#  1864#  1877#  1881#  1891#  1906#  1910#  1912#  1921#  1926#  1927#  1928#  1929#  1930#
                1933#  1936#  1940#  1945#  1946#  1949#  1950#  1953#  1954#  1957#  1958#  1961#  1963#  2004#  2031#
                2034#  2035#  2036#  2051#  2054#  2057#  2061#  2065#  2069#  2070#  2073#  2078#  2082#  2113#  2114#
                2115#  2117#  2118#  2120#  2121#  2123#  2125#  2127#  2131#  2135#  2166#  2167#  2169#  2170#  2172#
                2173#  2175#  2177#  2179#  2184#  2188#  2215#  2216#  2217#  2219#  2220#  2222#  2223#  2225#  2227#
                2229#  2234#  2238#  2265#  2266#  2267#  2268#  2269#  2270#  2271#  2272#  2273#  2274#  2275#  2277#
                2289#  2292#  2295#  2298#  2299#  2302#  2305#  2335#  2404#  2411#  2412#  2413#  2414#  2415#  2417#
                2432#  2444#  2445#  2446#  2447#  2448#  2449#  2450#  2451#  2452#  2454#  2479#  2482#
MSGNLS           893#  1804#  1809#  2051#  2054#  2057#  2061#  2065#  2078#  2082#  2127#  2131#  2135#  2179#  2184#
                2188#  2229#  2234#  2238#
MSGNSU          1256#  1267#  1279#  1291#  1303#  1313#  1325#  1337#  1349#  1365#  1396#  1407#  1420#  1432#  1444#
                1455#  1466#  1478#  1490#  1506#  1543#  1557#  1576#  1589#  1606#  1799#  1838#  1855#  1864#  1881#
                2031#  2073#  2125#  2177#  2227#
MSGNTA           601#   653#   812#   817#   822#   827#   831#   835#   839#  1139#  1185#  1194#  1235#  1265#  1277#
                1289#  1301#  1311#  1323#  1335#  1347#  1363#  1381#  1383#  1405#  1417#  1430#  1442#  1454#  1465#
                1476#  1488#  1504#  1522#  1523#  1555#  1568#  1587#  1600#  1618#  1624#  1631#  1636#  1641#  1646#
                1651#  1660#  1699#  1778#  1787#  1835#  1853#  1860#  1877#  1936#  1946#  1950#  1954#  1958#  1963#
                2004#  2070#  2123#  2175#  2225#  2275#  2292#  2299#  2305#  2335#  2432#  2479#
MSGNTE          1254#  1390#  1535#  1667#  1710#  1797#  2029#
MSHAPT           553#
MSHNAP           553#
MSINCR           536#   569#   587#   610#   672#   692#   809#   810#   811#   812#   814#   815#   816#   817#   819#
```

	820#	821#	822#	824#	825#	826#	827#	829#	830#	831#	833#	834#	835#	837#	838#
	839#	843#	892#	893#	928#	929#	1138#	1139#	1149#	1150#	1162#	1185#	1187#	1193#	1194#
	1202#	1212#	1220#	1235#	1254#	1256#	1261#	1262#	1263#	1264#	1265#	1267#	1273#	1274#	1275#
	1276#	1277#	1279#	1285#	1286#	1287#	1288#	1289#	1291#	1297#	1298#	1299#	1300#	1301#	1303#
	1307#	1308#	1309#	1310#	1311#	1313#	1319#	1320#	1321#	1322#	1323#	1325#	1331#	1332#	1333#
	1334#	1335#	1337#	1343#	1344#	1345#	1346#	1347#	1349#	1359#	1360#	1361#	1362#	1363#	1365#
	1377#	1378#	1379#	1380#	1381#	1383#	1390#	1394#	1396#	1401#	1402#	1403#	1404#	1405#	1407#
	1413#	1414#	1415#	1416#	1417#	1420#	1426#	1427#	1428#	1429#	1430#	1432#	1438#	1439#	1440#
	1441#	1442#	1444#	1450#	1451#	1452#	1453#	1454#	1455#	1461#	1462#	1463#	1464#	1465#	1466#
	1472#	1473#	1474#	1475#	1476#	1478#	1484#	1485#	1486#	1487#	1488#	1490#	1500#	1501#	1502#
	1503#	1504#	1506#	1518#	1519#	1520#	1521#	1522#	1523#	1535#	1541#	1543#	1544#	1546#	1549#
	1552#	1553#	1555#	1557#	1559#	1562#	1565#	1566#	1568#	1574#	1576#	1578#	1581#	1584#	1585#
	1587#	1589#	1591#	1594#	1597#	1598#	1600#	1604#	1606#	1608#	1609#	1612#	1615#	1616#	1618#
	1619#	1622#	1628#	1629#	1630#	1631#	1633#	1634#	1635#	1636#	1638#	1639#	1640#	1641#	1643#
	1644#	1645#	1646#	1648#	1649#	1650#	1651#	1660#	1667#	1672#	1676#	1680#	1685#	1689#	1693#
	1697#	1699#	1710#	1712#	1721#	1722#	1723#	1746#	1752#	1763#	1768#	1770#	1776#	1777#	1778#
	1787#	1797#	1799#	1800#	1804#	1809#	1824#	1825#	1826#	1827#	1833#	1834#	1835#	1838#	1842#
	1843#	1844#	1845#	1851#	1852#	1853#	1855#	1860#	1864#	1877#	1881#	1891#	1906#	1910#	1912#
	1921#	1926#	1928#	1929#	1930#	1933#	1936#	1940#	1944#	1945#	1946#	1948#	1949#	1950#	1952#
	1953#	1954#	1956#	1957#	1958#	1960#	1961#	1963#	2004#	2029#	2031#	2034#	2035#	2051#	2054#
	2057#	2061#	2065#	2069#	2070#	2073#	2078#	2082#	2113#	2114#	2115#	2117#	2118#	2120#	2121#
	2123#	2125#	2127#	2131#	2135#	2166#	2167#	2169#	2170#	2172#	2173#	2175#	2177#	2179#	2184#
	2188#	2215#	2216#	2217#	2219#	2220#	2222#	2223#	2225#	2227#	2229#	2234#	2238#	2265#	2266#
	2267#	2268#	2269#	2270#	2271#	2272#	2273#	2274#	2275#	2277#	2288#	2289#	2292#	2294#	2295#
	2298#	2299#	2301#	2302#	2305#	2335#	2404#	2444#							
MSLDRO	1150#	1162#	1212#	1546#	1549#	1559#	1562#	1578#	1581#	1591#	1594#	1609#	1612#		
MSMCHI	521#														
MSMCLO	521#														
MSPOP	554#	571#	601#	653#	684#	725#	812#	817#	822#	827#	831#	835#	839#	1139#	1185#
	1191#	1194#	1235#	1265#	1277#	1289#	1301#	1311#	1323#	1335#	1347#	1363#	1381#	1383#	1405#
	1417#	1430#	1442#	1454#	1465#	1476#	1488#	1504#	1522#	1523#	1555#	1568#	1587#	1600#	1618#
	1624#	1631#	1636#	1641#	1646#	1651#	1660#	1699#	1778#	1787#	1835#	1853#	1860#	1877#	1936#
	1946#	1950#	1954#	1958#	1963#	2004#	2070#	2123#	2175#	2225#	2275#	2292#	2299#	2305#	2335#
	2432#	2479#													
MSPRIN	810#	811#	815#	816#	820#	821#	825#	826#	830#	834#	838#	843#	892#	1629#	1630#
	1634#	1635#	1639#	1640#	1644#	1645#	1649#	1650#	1746#	1752#	1763#	1768#	1777#	1891#	1906#
	1910#	1912#	1921#	1930#	1933#	1945#	1949#	1953#	1957#	1961#	2289#	2295#	2298#	2302#	
MSPUSH	536#	569#	587#	610#	672#	692#	809#	814#	819#	824#	829#	833#	837#	1138#	1149#
	1187#	1193#	1202#	1254#	1256#	1267#	1279#	1291#	1303#	1313#	1325#	1337#	1349#	1365#	1390#
	1396#	1407#	1420#	1432#	1444#	1455#	1466#	1478#	1490#	1506#	1535#	1543#	1557#	1576#	1589#
	1606#	1622#	1628#	1633#	1638#	1643#	1648#	1667#	1710#	1776#	1797#	1799#	1838#	1855#	1864#
	1881#	1944#	1948#	1952#	1956#	1960#	2029#	2031#	2073#	2125#	2177#	2227#	2288#	2294#	2301#
	2404#	2444#													
MSPUT	810#	811#	815#	816#	820#	821#	825#	826#	830#	834#	838#	843#	892#	1544#	1629#
	1630#	1634#	1635#	1639#	1640#	1644#	1645#	1649#	1650#	1746#	1752#	1763#	1768#	1777#	1891#
	1906#	1910#	1912#	1921#	1930#	1933#	1945#	1949#	1953#	1957#	1961#	2289#	2295#	2298#	2302#
MSPUT1	810#	811#	815#	816#	820#	821#	825#	826#	830#	834#	838#	843#	892#	1544#	1629#
	1630#	1634#	1635#	1639#	1640#	1644#	1645#	1649#	1650#	1746#	1752#	1763#	1768#	1777#	1891#
	1906#	1910#	1912#	1921#	1930#	1933#	1945#	1949#	1953#	1957#	1961#	2289#	2295#	2298#	2302#
MSRADI	893#	1804#	1809#	2051#	2054#	2057#	2061#	2065#	2078#	2082#	2127#	2131#	2135#	2179#	2184#
	2188#	2229#	2234#	2238#	2411#	2412#	2413#	2414#	2415#	2445#	2446#	2447#	2448#	2449#	2450#
	2451#	2452#													
MSRNRO	1150#														
MSSETS	536#	569#	587#	610#	672#	692#	809#	814#	819#	824#	829#	833#	837#	1138#	1149#
	1187#	1193#	1202#	1254#	1256#	1267#	1279#	1291#	1303#	1313#	1325#	1337#	1349#	1365#	1390#
	1396#	1407#	1420#	1432#	1444#	1455#	1466#	1478#	1490#	1506#	1535#	1543#	1557#	1576#	1589#

```
                1606#  1622#  1628#  1633#  1638#  1643#  1648#  1667#  1710#  1776#  1797#  1799#  1838#  1855#  1864#
                1881#  1944#  1948#  1952#  1956#  1960#  2029#  2031#  2073#  2125#  2177#  2227#  2288#  2294#  2301#
                2404#  2444#
MSSVC            810#   811#   812#   815#   816#   817#   820#   821#   822#   825#   826#   827#   830#   831#   834#
                 835#   838#   839#   843#   892#   893#   928    929#  1139#  1150#  1162#  1185#  1194#  1212#  1220#
                1235#  1256#  1261   1262#  1263#  1264#  1265#  1267#  1273   1274#  1275#  1276#  1277#  1279#  1285
                1286#  1287#  1288#  1289#  1291#  1297   1298#  1299#  1300#  1301#  1303#  1307   1308#  1309#  1310#
                1311#  1313#  1319   1320#  1321#  1322#  1323#  1325#  1331   1332#  1333#  1334#  1335#  1337#  1343
                1344#  1345#  1346#  1347#  1349#  1359   1360#  1361#  1362#  1363#  1365#  1377   1378#  1379#  1380#
                1381#  1383#  1394#  1396#  1401   1402#  1403#  1404#  1405#  1407#  1413   1414#  1415#  1416#  1417#
                1420#  1426   1427#  1428#  1429#  1430#  1432#  1438   1439#  1440#  1441#  1442#  1444#  1450   1451#
                1452#  1453#  1454#  1455#  1461   1462#  1463#  1464#  1465#  1466#  1472   1473#  1474#  1475#  1476#
                1478#  1484   1485#  1486#  1487#  1488#  1490#  1500   1501#  1502#  1503#  1504#  1506#  1518   1519#
                1520#  1521#  1522#  1523#  1541#  1543#  1544#  1546#  1549#  1552   1553#  1555#  1557#  1559#  1562#
                1565   1566#  1568#  1574#  1576#  1578#  1581#  1584   1585#  1587#  1589#  1591#  1594#  1597   1598#
                1600#  1604#  1606#  1608#  1609#  1612#  1615   1616#  1618#  1619#  1629#  1630#  1631#  1634#  1635#
                1636#  1639#  1640#  1641#  1644#  1645#  1646#  1649#  1650#  1651#  1660#  1672#  1676#  1680#  1685#
                1689#  1693#  1697#  1699#  1712#  1721   1722#  1723#  1746#  1752#  1763#  1768#  1770#  1777#  1778#
                1787#  1799#  1800#  1804#  1809#  1824   1825#  1826#  1827#  1833   1834#  1835#  1838#  1842   1843#
                1844#  1845#  1851   1852#  1853#  1855#  1860#  1864#  1877#  1881#  1891#  1906#  1910#  1912#  1921#
                1926#  1928   1929#  1930#  1933#  1936#  1940#  1945#  1946#  1949#  1950#  1953#  1954#  1957#  1958#
                1961#  1963#  2004#  2031#  2034#  2035#  2051#  2054#  2057#  2061#  2065#  2069#  2070#  2073#  2078#
                2082#  2113#  2114   2115#  2117   2118#  2120   2121#  2123#  2125#  2127#  2131#  2135#  2166   2167#
                2169   2170#  2172   2173#  2175#  2177#  2179#  2184#  2188#  2215#  2216   2217#  2219   2220#  2222
                2223#  2225#  2227#  2229#  2234#  2238#  2265#  2266   2267#  2268#  2269   2270#  2271#  2272   2273#
                2274#  2275#  2277#  2289#  2292#  2295#  2298#  2299#  2302#  2305#  2335#  2417#  2454#
MSTLAB           810#   811#   812#   815#   816#   817#   820#   821#   822#   825#   826#   827#   830#   831#   834#
                 835#   838#   839#   843#   892#   893#   928#   929#  1139#  1150#  1162#  1185#  1194#  1212#  1220#
                1235#  1256#  1261#  1262#  1263#  1264#  1265#  1267#  1273#  1274#  1275#  1276#  1277#  1279#  1285#
                1286#  1287#  1288#  1289#  1291#  1297#  1298#  1299#  1300#  1301#  1303#  1307#  1308#  1309#  1310#
                1311#  1313#  1319#  1320#  1321#  1322#  1323#  1325#  1331#  1332#  1333#  1334#  1335#  1337#  1343#
                1344#  1345#  1346#  1347#  1349#  1359#  1360#  1361#  1362#  1363#  1365#  1377#  1378#  1379#  1380#
                1381#  1383#  1394#  1396#  1401#  1402#  1403#  1404#  1405#  1407#  1413#  1414#  1415#  1416#  1417#
                1420#  1426#  1427#  1428#  1429#  1430#  1432#  1438#  1439#  1440#  1441#  1442#  1444#  1450#  1451#
                1452#  1453#  1454#  1455#  1461#  1462#  1463#  1464#  1465#  1466#  1472#  1473#  1474#  1475#  1476#
                1478#  1484#  1485#  1486#  1487#  1488#  1490#  1500#  1501#  1502#  1503#  1504#  1506#  1518#  1519#
                1520#  1521#  1522#  1523#  1541#  1543#  1544#  1546#  1549#  1552#  1553#  1555#  1557#  1559#  1562#
                1565#  1566#  1568#  1574#  1576#  1578#  1581#  1584#  1585#  1587#  1589#  1591#  1594#  1597#  1598#
                1600#  1604#  1606#  1608#  1609#  1612#  1615#  1616#  1618#  1619#  1629#  1630#  1631#  1634#  1635#
                1636#  1639#  1640#  1641#  1644#  1645#  1646#  1649#  1650#  1651#  1660#  1672#  1676#  1680#  1685#
                1689#  1693#  1697#  1699#  1712#  1721#  1722#  1723#  1746#  1752#  1763#  1768#  1770#  1777#  1778#
                1787#  1799#  1800#  1804#  1809#  1824#  1825#  1826#  1827#  1833#  1834#  1835#  1838#  1842#  1843#
                1844#  1845#  1851#  1852#  1853#  1855#  1860#  1864#  1877#  1881#  1891#  1906#  1910#  1912#  1921#
                1926#  1928#  1929#  1930#  1933#  1936#  1940#  1945#  1946#  1949#  1950#  1953#  1954#  1957#  1958#
                1961#  1963#  2004#  2031#  2034#  2035#  2051#  2054#  2057#  2061#  2065#  2069#  2070#  2073#  2078#
                2082#  2113#  2114#  2115#  2117#  2118#  2120#  2121#  2123#  2125#  2127#  2131#  2135#  2166#  2167#
                2169#  2170#  2172#  2173#  2175#  2177#  2179#  2184#  2188#  2215#  2216#  2217#  2219#  2220#  2222#
                2223#  2225#  2227#  2229#  2234#  2238#  2265#  2266#  2267#  2268#  2269#  2270#  2271#  2272#  2273#
                2274#  2275#  2277#  2289#  2292#  2295#  2298#  2299#  2302#  2305#  2335#
MSTSTL           810#   811#   812#   815#   816#   817#   820#   821#   822#   825#   826#   827#   830#   831#   834#
                 835#   838#   839#   843#   892#   893#   928#   929#  1139#  1150#  1162#  1185#  1194#  1212#  1220#
                1235#  1256#  1261#  1262#  1263#  1264#  1265#  1267#  1273#  1274#  1275#  1276#  1277#  1279#  1285#
                1286#  1287#  1288#  1289#  1291#  1297#  1298#  1299#  1300#  1301#  1303#  1307#  1308#  1309#  1310#
                1311#  1313#  1319#  1320#  1321#  1322#  1323#  1325#  1331#  1332#  1333#  1334#  1335#  1337#  1343#
                1344#  1345#  1346#  1347#  1349#  1359#  1360#  1361#  1362#  1363#  1365#  1377#  1378#  1379#  1380#
                1381#  1383#  1394#  1396#  1401#  1402#  1403#  1404#  1405#  1407#  1413#  1414#  1415#  1416#  1417#
```

```
                1420#   1426#   1427#   1428#   1429#   1430#   1432#   1438#   1439#   1440#   1441#   1442#   1444#   1450#   1451#
                1452#   1453#   1454#   1455#   1461#   1462#   1463#   1464#   1465#   1466#   1472#   1473#   1474#   1475#   1476#
                1478#   1484#   1485#   1486#   1487#   1488#   1490#   1500#   1501#   1502#   1503#   1504#   1506#   1518#   1519#
                1520#   1521#   1522#   1523#   1541#   1543#   1544#   1546#   1549#   1552#   1553#   1555#   1557#   1559#   1562#
                1565#   1566#   1568#   1574#   1576#   1578#   1581#   1584#   1585#   1587#   1589#   1591#   1594#   1597#   1598#
                1600#   1604#   1606#   1608#   1609#   1612#   1615#   1616#   1618#   1619#   1629#   1630#   1631#   1634#   1635#
                1636#   1639#   1640#   1641#   1644#   1645#   1646#   1649#   1650#   1651#   1660#   1672#   1676#   1680#   1685#
                1689#   1693#   1697#   1699#   1712#   1721#   1722#   1723#   1746#   1752#   1763#   1768#   1770#   1777#   1778#
                1787#   1799#   1800#   1804#   1809#   1824#   1825#   1826#   1827#   1833#   1834#   1835#   1838#   1842#   1843#
                1844#   1845#   1851#   1852#   1853#   1855#   1860#   1864#   1877#   1881#   1891#   1906#   1910#   1912#   1921#
                1926#   1928#   1929#   1930#   1933#   1936#   1940#   1945#   1946#   1949#   1950#   1953#   1954#   1957#   1958#
                1961#   1963#   2004#   2031#   2034#   2035#   2051#   2054#   2057#   2061#   2065#   2069#   2070#   2073#   2078#
                2082#   2113#   2114#   2115#   2117#   2118#   2120#   2121#   2123#   2125#   2127#   2131#   2135#   2166#   2167#
                2169#   2170#   2172#   2173#   2175#   2177#   2179#   2184#   2188#   2215#   2216#   2217#   2219#   2220#   2222#
                2223#   2225#   2227#   2229#   2234#   2238#   2265#   2266#   2267#   2268#   2269#   2270#   2271#   2272#   2273#
                2274#   2275#   2277#   2289#   2292#   2295#   2298#   2299#   2302#   2305#   2335#
MSWORD           553#    570#    893#    928#   1220#   1261#   1263#   1273#   1275#   1285#   1287#   1297#   1299#   1307#   1309#
                1319#   1321#   1331#   1333#   1343#   1345#   1359#   1361#   1377#   1379#   1394#   1401#   1403#   1413#   1415#
                1426#   1428#   1438#   1440#   1450#   1452#   1461#   1463#   1472#   1474#   1484#   1486#   1500#   1502#   1518#
                1520#   1541#   1552#   1565#   1574#   1584#   1597#   1604#   1615#   1619#   1680#   1697#   1721#   1723#   1770#
                1804#   1809#   1824#   1826#   1833#   1842#   1844#   1851#   1928#   1940#   2034#   2051#   2054#   2057#   2061#
                2065#   2069#   2078#   2082#   2113#   2114#   2117#   2120#   2127#   2131#   2135#   2166#   2169#   2172#   2179#
                2184#   2188#   2215#   2216#   2219#   2222#   2229#   2234#   2238#   2265#   2266#   2268#   2269#   2271#   2272#
                2274#   2277#   2411#   2412#   2413#   2414#   2415#   2417#   2445#   2446#   2447#   2448#   2449#   2450#   2451#
                2452#   2454#   2482
MSXFER          2417#   2454#
POINTE           543
PRINTB           810     815     820     825     830     834     838    1629    1630    1634    1635    1639    1640    1644    1645
                1649    1650    1777    1945    1949    1953    1957    1961    2289    2295    2298    2302
PRINTF           843     892    1746    1752    1763    1768    1891    1906    1910    1912    1921    1930    1933
PRINTX           811     816     821     826
SETPRI          1162    1546    1549    1559    1562    1578    1581    1591    1594    1609    1612
SETVEC          1544
SVC              520#    521
XFER            1220#   1263#   1275#   1287#   1299#   1309#   1321#   1333#   1345#   1361#   1379#   1394#   1403#   1415#   1428#
                1440#   1452#   1463#   1474#   1486#   1502#   1520#   1541#   1574#   1604#   1619#   1680#   1697#   1723#   1770#
                1826#   1844#   1940#   2034#   2069#   2113#   2215#   2265#   2268#   2271#   2274#   2277#   2417#   2454#

. ABS.  020074     000


 ERRORS DETECTED:  0

 CVM8AF,CVM8AF/CRF/NL:TOC=SVC.M11/ML,CVM8AF.P11
 RUN-TIME: 30 29 3 SECONDS
 RUN-TIME RATIO: 107/64=1.6
 CORE USED:  18K  (36 PAGES)
```