```
                        .REM %

                              IDENTIFICATION
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                        PRODUCT CODE:           AC-F542A-MC

                        PRODUCT NAME:           CXBMIA0 BOOT ROM MODULE

                        PROGRAM DATE:           MAY 1979

                        MAINTAINER:             DEC/X11 SUPPORT GROUP
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                        1. ABSTRACT

                                BMI IS A BKMOD THAT DOES A READ CRC AND
                                LPC CHECK ON THE ROM SELECTED BY SR1.


                        2. REQUIREMENTS

                                HARDWARE: ANY PDP-11 WITH A ROM.
                                STORAGE : BMI REQUIRES
                                          1. DECIMAL WORDS: 417
                                          2. OCTAL WORDS  :641
                                          3. OCTAL BYTES  :1502


                        3. PASS DEFINITION

                                ONE PASS CONSISTS OF DOING A CRC AND LPC CHECK ON
                                THE ROM 3000(8) TIMES.


                        4. EXECUTION TIME

                                BMI RUNNING ALONE TAKES APPROXIMATELY ONE MINUTE
                                45 SECONDS.


                        5. CONFIGURATION REQUIREMENTS

                                SR1 IS USED TO SELECTTHE VERSION OF THE ROM BOOTSTRAP TO BE TESTED
                                ACCORDING TO THE FOLLOWING TABLE. NOTE: THESE SETTINGS ARE
                                OCTAL NUMBERS. THEY ARE NOT PARTICULAR SWITCHES SET TO A
                                ONE. FOR EXAMPLE, TO SELECT THE M9301-YH VERSION, SET
                                SWITCHES #3 AND #1 IN SR1.THIS CORRESPONDS TO AN OCTAL 12.

                                        SWR     MODULE VERSION
                                        ---     --------------

                                        1       M9301-YA
                                        2       M9301-YB
                                        3       M9301-YC
                                        4       M9400-YA (OR YC)
                                        5       M9301-YF
                                        6       M7942-YB
                                        7       M9301-YD
                                        10      M9400-YH (OR YK)
                                        11      M9311
                                        12      M9301-YH
                                        13      M9301-YE
                                        14      M9301-YJ
                                        15      M9400-YN
                                        16      UNUSED
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                        6. DEVICE/OPTION SETUP

                                NONE


                        7. MODULE OPERATION

                                READS EACH ROM LOCATION AND CALCULATES A CRC WORD
                                AND LPC WORD FOR THE SELECTED ROM. IT COMPARES BOTH
                                WORDS AGAINST THE EXPECTED VALUE THAT IS GETS FROM
                                THE TABLE.


                        8. OPERATING OPTIONS

                                NONE


                        9. NON-STANDARD PRINTOUTS

                                NONE



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                                    PKMOD   <BMIA >,,,,,,300,13
                                            MODULE  40020,BMIA ,,,,,,300,13
                                            .TITLE  BMIA DEC/X11 SYSTEM EXERCISER MODULE
                                    ;       DDXCOM  VERSION  6       23-MAY-78
                                            .LIST   BIN
                                    ;*****************************************************************************
                                    BEGIN:
000000'                             MODNAM: .ASCII  /BMIA / ;MODULE NAME.
000000' 046502  040511      040     XFLAG:  .BYTE   OPEN            ;USED TO KEEP TRACK OF WBUFF USAGE
000005'     000                     ADDR:   +0              ;1ST DEVICE ADDR.
000006' 000000                      VECTOR: +0              ;1ST DEVICE VECTOR.
000010' 000000                      BR1:    .BYTE   PRTY+0  ;1ST BR LEVEL.
000012'     000                     BR2:    .BYTE   PRTY+0  ;2ND BR LEVEL.
000013'     000                     DVID1:  +1              ;DEVICE INDICATOR 1.
000014' 000001                      SR1:    OPEN            ;SWITCH REGISTER 1
000016' 000000                      SR2:    OPEN            ;SWITCH REGISTER 2
000020' 000000                      SR3:    OPEN            ;SWITCH REGISTER 3
000022' 000000                      SR4:    OPEN            ;SWITCH REGISTER 4
000024' 000000                      ;*****************************************************************************
                                    STAT:   40020           ;STATUS WORD.
000026' 040020                      INIT:   START           ;MODULE START ADDR.
000030' 000252'                     SPOINT: MODSP           ;MODULE STACK POINTER.
000032' 000224'                     PASCNT: 0               ;PASS COUNTER.
000034' 000000                      ICONT:  300             ;# OF ITERATIONS PER PASS=300
000036' 000300                      ICOUNT: 0               ;LOC TO COUNT ITERATIONS
000040' 000000                      SOFCNT: 0               ;LOC TO SAVE TOTAL SOFT ERRORS
000042' 000000                      HRDCNT: 0               ;LOC TO SAVE TOTAL HARD ERRORS
000044' 000000                      SOFPAS: 0               ;LOC TO SAVE SOFT ERRORS PER PASS
000046' 000000                      HRDPAS: 0               ;LOC TO SAVE HARD ERRORS PER PASS
000050' 000000                      SYSCNT: 0               ;# OF SYS ERRORS ACCUMULATED
000052' 000000                      RANNUM: 0               ;HOLDS RANDOM # WHEN RAND MACRO IS CALLED
000054' 000000                      CONFIG:                 ;RESERVED FOR MONITOR USE
000056'                             RES1:   0               ;RESERVED FOR MONITOR USE
000056' 000000                      RES2:   0               ;RESERVED FOR MONITOR USE
000060' 000000                      SVR0:   OPEN            ;LOC TO SAVE R0.
000062' 000000                      SVR1:   OPEN            ;LOC TO SAVE R1.
000064' 000000                      SVR2:   OPEN            ;LOC TO SAVE R2.
000066' 000000                      SVR3:   OPEN            ;LOC TO SAVE R3.
000070' 000000                      SVR4:   OPEN            ;LOC TO SAVE R4.
000072' 000000                      SVR5:   OPEN            ;LOC TO SAVE R5.
000074' 000000                      SVR6:   OPEN            ;LOC TO SAVE R6.
000076' 000000                      CSRA:   OPEN            ;ADDR OF CURRENT CSR.
000100' 000000                      SBADR:                  ;ADDR OF GOOD DATA, OR
000102'                             ACSR:   OPEN            ;CONTENTS OF CSR.
000102' 000000                      WASADR:                 ;ADDR OF BAD DATA, OR
000104'                             ASTAT:  OPEN            ;STATUS REG CONTENTS.
000104' 000000                      ERRTYP:                 ;TYPE OF ERROR
000106'                             ASB:    OPEN            ;EXPECTED DATA.
000106' 000000                      AWAS:   OPEN            ;ACTUAL DATA.
000110' 000000                      RSTRT:  RESTRT          ;RESTART ADDRESS AFTER END OF PASS
000112' 000252'                     WDTO:   OPEN            ;WORDS TO MEMORY PER ITERATION
000114' 000000                      WDFR:   OPEN            ;WORDS FROM MEMORY PER ITERATION
000116' 000000                      INTR:   OPEN            ;# OF INTERRUPTS PER ITERATION
000120' 000000                      IDNUM:  13              ;MODULE IDENTIFICATION NUMBER=13
000122' 000013                              .REPT   SPSIZ   ;MODULE STACK STARTS HERE.
          000040
```



```
                                            .NLIST
                                            .WORD   0
                                            .LIST
                                            .ENDR
000224'                             MODSP:
                                    ;*****************************************************************************
000224' 173000                      ROMSA1: 173000
000226' 001000                      DATLN1: 512.
000230' 165000                      ROMSA2: 165000
000232' 001000                      DATLN2: 512.
000234' 000000                      XORS:   0
000236' 000000                      EXCRC:  0
000240' 000000                      EXLPC:  0
000242' 000000                      ACTCRC: 0
000244' 000000                      ACTLPC: 0
000246' 000000                      PARCNT: 0
000250' 000000                      TYPOUT: 0

000252'                             START:
000252'                             RESTRT:
000252' 016700  177540              1$:     MOV     SR1,R0                  ;GET SR1
000256' 001005                              BNE     ST2
000260' 104403  000000' 001442'             MSGN$,BEGIN,ADR ;ASCII MESSAGE CALL WITH COMMON HEADER
000266' 104410  000000'                     END$,BEGIN              ;
000272' 006300                      ST2:    ASL     R0
000274' 016067  001142' 177736              MOV     TXLPC(R0),EXLPC         ;FETCH EXPECT. LPC
000302' 016067  001074' 177726              MOV     TXCRC(R0),EXCRC         ;FETCH EXPECTED CRC
000310' 016067  001212' 177710              MOV     TDLN1(R0),DATLN1        ;FETCH 1ST LENGTH
000316' 016067  001260' 177700              MOV     TRMSA1(R0),ROMSA1       ;FETCH 1ST STARTING ADDR.
000324' 016067  001326' 177700              MOV     TDLN2(R0),DATLN2        ;FETCH 2ND LENGTH
000332' 016067  001374' 177670              MOV     TRMSA2(R0),ROMSA2       ;FETCH 2ND STARTING ADDR
000340' 005067  177676              1$:     CLR     ACTCRC                  ;CLEAR STORAGE FOR ACTUAL CRC
000344' 005067  177674                      CLR     ACTLPC                  ;CLEAR STORAGE FOR ACTULAL LPC
000350' 016700  177652                      MOV     DATLN1,R0               ;SET LENGTH OF 1ST ROM SPACE
000354' 001413                              BEQ     CH0                     ;IF NO VERSION SELECTED:  BR
000356' 016701  177642                      MOV     ROMSA1,R1               ;POINT TO START OF 1ST ROM SPACE
000362' 004767  000200                      JSR     PC,CRC                  ;COMPUTE FIRST HALF OF CRC
000366' 016701  177632                      MOV     ROMSA1,R1               ;POINT TO START OF 1ST ROM ADDRS.
000372' 016700  177630                      MOV     DATLN1,R0               ;SET LENGTH OF 1ST ROM ADDRS.
000376' 006200                              ASR     R0                      ;CONVERT TO WORDS
000400' 004767  000432                      JSR     PC,LPC                  ;COMPUTE FIRST HALF OF CRC
000404' 016701  177620              CH0:    MOV     ROMSA2,R1               ;POINT TO 2ND ROM ADDRS.
000410' 016700  177616                      MOV     DATLN2,R0               ;SET LENGTH OF 2ND ROM ADDRS.
000414' 001411                              BEQ     CH1                     ;BR IF THIS SPACE NOT USED
000416' 004767  000144                      JSR     PC,CRC                  ;COMPUTE REMAINDER OF CRC
000422' 016701  177602                      MOV     ROMSA2,R1               ;POINT TO START OF 2ND ROM ADDRS.
000426' 016700  177600                      MOV     DATLN2,R0               ;SET LENGTH OF 2ND ROM ADDRS.
000432' 006200                              ASR     R0                      ;CONVERT TO WORDS
000434' 004767  000376                      JSR     PC,LPC                  ;COMPUTE REMAINDER OF LPC
000440' 026767  177572  177574      CH1:    CMP     EXCRC,ACTCRC            ;COMPUTED = EXPECTED ?
000446' 001420                              BEQ     CK1                     ;IF SO:  BR
000450' 016767  177550  177424              MOV     ROMSA1,ACSR
000456' 016767  177542  177416              MOV     ROMSA1,SBADR
000464' 005067  177414                      CLR     WASADR
000470' 016767  177542  177410              MOV     EXCRC,ASB
000476' 016767  177540  177404              MOV     ACTCRC,AWAS
```

```
                                        ;*****************************************************************
                                        DATER$,BEGIN            ;DATA ERROR!!!
                                        ;*****************************************************************
000504' 104404  000000'
(1)
(1)
                                        CMP     ACTLPC,EXLPC            ;COMPARE EXPT. LPC=ACTUAL LPC
000510' 026767  177530  177522  CK1:    BEQ     PASS                    ;IF SO:  BR
000516' 001420                          MOV     ROMSA1,ACSR
000520' 016767  177500  177354          MOV     ROMSA1,SBADR
000526' 016767  177472  177346          CLR     WASADR
000534' 005067  177344                  MOV     EXLPC,ASB
000540' 016767  177474  177340          MOV     ACTLPC,AWAS
000546' 016767  177472  177334          ;*****************************************************************
                                        DATER$,BEGIN            ;DATA ERROR!!!
                                        ;*****************************************************************
000554' 104404  000000'
(1)
(1)
                                PASS:
000560'                                 ENDIT$,BEGIN            ;SIGNAL END OF ITERATION.
000560' 104413  000000'                                         ;MONITOR SHALL TEST END OF PASS
(1)
                                        BR      RESTPT
000564' 000632
                                        MOV     ACTCRC,XORS
000566' 016767  177450  177440  CRC:    MOVB    (R1),R4                 ;GET CHAR.
000574' 111104                  CL0:    CMP     #173024,R1              ;LOCATION EFFECTED BY SWITCHES
000576' 022701  173024                  BNE     CL3                     ;IF NOT:  BR
000602' 001004                          DEC     R0                      ;FIX COUNTERS
000604' 005300                          DEC     R0
000606' 005300                          TST     (R1)+                   ;FIX POINTER
000610' 005721                          BR      CL0                     ;CONTINUE
000612' 000770                  CL3:    JSR     PC,PARITY               ;GO GET PARITY
000614' 004767  000114                  JSR     PC,XOR                  ;XOR CHAR
000620' 004767  000166          ;       CLC                             ;ROTATE 1 POS. RIGHT
000624' 000241                          ROR     R4                      ;IF NO CARRY:  BR
000626' 006004                          BCC     CL2                     ;SET BIT NINE
000630' 103014                          BIS     #400,R4
000632' 052704  000400          ;       CLC                             ;SAVE CHAR
000636' 000241                  CL1:    MOV     R4,R5
000640' 010405                          BIC     #177703,R5
000642' 042705  177703                  COM     R5
000646' 005105                          BIC     #177703,R5
000650' 042705  177703                  BIC     #74,R4
000654' 042704  000074                  BIS     R5,R4
000660' 050504                  CL2:    MOV     R4,XORS
000662' 010467  177346                  DEC     R0                      ;IF LAST CAR.!  BR
000666' 005300                          BEQ     CLLAST                  ;GET NEXT CHAR.
000670' 001402                          JMP     CL0
000672' 000167  177676          CLLAST: MOV     XORS,R4
000676' 016704  177332                  COM     XORS
000702' 005167  177326                  BIC     #177050,XORS            ;COMPLEMENT ALL BUT BITS 3 & 5
000706' 042767  177050  177320          BIC     #177727,R4
000714' 042704  177727                  BIS     R4,XORS
000720' 050467  177310                  MOV     XORS,ACTCRC
000724' 016767  177304  177310          RTS     PC
000732' 000207
000734' 005067  177306          PARITY: CLR     PARCNT                  ;CLEAR BIT COUNTER
000740' 012703  000010                  MOV     #10,R3                  ;SET NO. OF BITS
000744' 032704  000001          CLP0:   BIT     #1,R4                   ;SEE IF ONE BIT
000750' 001402                          BEQ     CLP1                    ;IF NOT:  BR
```



```
000752' 005267  177270                  INC     PARCNT                  ;BUMP COUNTER
000756' 000241          CLP1:   CLC
000760' 006004                  ROR     R4                      ;ROTATE TO NEXT BIT
000762' 005303                  DEC     R3
000764' 001367                  BNE     CLP0                    ;CONTINUE FOR ALL BITS
000766' 112104                  MOVB    (R1)+,R4
000770' 042704  177400          BIC     #177400,R4
000774' 032767  000001  177244  BIT     #1,PARCNT               ;SEE IF ODD # OF ONE BITS
001002' 001002                  BNE     CLP2                    ;IF SO:  BR
001004' 052704  000400          BIS     #400,R4                 ;SET PARITY BIT
001010' 000207          CLP2:   RTS     PC                      ;EXIT

001012' 010446          XOR:    MOV     R4,-(SP)                ;XOR SUBROUTINE: R4 WITH XORS
001014' 046716  177214          BIC     XORS,(SP)
001020' 040467  177210          BIC     R4,XORS
001024' 052667  177204          BIS     (SP)+,XORS
001030' 016704  177200          MOV     XORS,R4
001034' 000207                  RTS     PC

001036' 016767  177202  177170  LPC:    MOV     ACTLPC,XORS
001044' 012104          LPC1:   MOV     (R1)+,R4
001046' 022701  173026          CMP     #173026,R1              ;LOCATION EFFECTED BY SWITCHES
001052' 001402                  BEQ     LPC2                    ;IF SO:  SKIP LOC. BY BRANCHING
001054' 004767  177732          JSR     PC,XOR
001060' 005300          LPC2:   DEC     R0
001062' 001370                  BNE     LPC1
001064' 016767  177144  177152  MOV     XORS,ACTLPC
001072' 000207                  RTS     PC


001074' 177777          TXCRC:  =1              ;TABLE OF CRC VALUES
001076' 000571                  571             ;M9301 - YA VERSION
001100' 000457                  457             ;M9301 - YB VERSION
001102' 000243                  243             ;M9301 - YC VERSION
001104' 000635                  635             ;M9400 - YA(OR YC) VERSION
001106' 000207                  207             ;M9301 - YF VERSION
001110' 000670                  670             ;M7942 - YB VERSION
001112' 000132                  132             ;M9301- YD VERSION
001114' 000374                  374             ;M9400 - YH (OR YK) VERSION
001116' 000710                  710             ;M9311 VERSION
001120' 000536                  536             ;M9301 - YH VERSION
001122' 000752                  752             ;M9301 - YE VERSION
001124' 000633                  633             ;M9301 - YJ VERSION
001126' 000650                  650             ;M9400 - YN VERSION
001130' 177777                  =1
001132' 177777                  =1
001134' 177777                  =1
001136' 177777                  =1
001140' 177777                  =1

001142' 177777          TXLPC:  =1              ;TABLE OF LPC VALUES
001144' 133725                  133725          ;M9301 - YA VERSION
001146' 017563                  17563           ;M9301 - YB VERSION
001150' 141744                  141744          ;M9301 - YC VERSION
001152' 047613                  47613           ;M9400 - YA(OR YC) VERSION
001154' 114175                  114175          ;M9301 - YF VERSION
```

```
   660  001156' 146126                          146126          ;M7942 = YB VERSION
   661  001160' 132161                          132161          ;M9301 = YD VERSION
   662  001162' 143466                          143466          ;M9400 = YH(OR YK) VERSION
   663  001164' 036743                          036743          ;M9311 VERSION
   664  001166' 125411                          125411          ;M9301 = YH VERSION
   665  001170' 066246                          066246          ;M9301 = YE VERSION
   666  001172' 132367                          132367          ;M9301 = YJ VERSION
   667  001174' 030210                          30210           ;M9400 = YN VERSION
   668  001176' 177777                          -1
   669  001200' 177777                          -1
   670  001202' 177777                          -1
   671  001204' 177777                          -1
   672  001206' 177777                          -1
   673  001210' 177777                          -1
   674
   675  001212' 177777                  TDLN1:  -1              ;TABLE OF THE LENGTH (BYTES) OF 1ST ROM ADDRESS SPACE
   676  001214' 001000                          1000            ;M9301 = YA VERSION
   677  001216' 001000                          1000            ;M9301 = YB VERISION
   678  001220' 001000                          1000            ;M9301 = YC VERSION
   679  001222' 001000                          1000            ;M9400 = YA(OR YC) VERSION
   680  001224' 001000                          1000            ;M9301 = YF VERSION
   681  001226' 004000                          4000            ;M7942 = YB VERSION
   682  001230' 001000                          1000            ;M9301 = YD VERSION
   683  001232' 001000                          1000            ;M9400 = YH(OR YK) VERSION
   684  001234' 001000                          1000            ;M9311 VERSION
   685  001236' 000734                          734             ;M9301 = YH VERSION
   686  001240' 001000                          1000            ;M9301 = YE VERSION
   687  001242' 001000                          1000            ;M9301 = YJ VERSION
   688  001244' 001000                          1000            ;M9400 = YN VERSION
   689  001246' 177777                          -1
   690  001250' 177777                          -1
   691  001252' 177777                          -1
   692  001254' 177777                          -1
   693  001256' 177777                          -1
   694
   695  001260' 177777                  TRMSA1: -1              ;TABLE OF THE STARTING ADDRESS OF 1ST ROM SPACE
   696  001262' 173000                          173000          ;M9301 = YA VERSION
   697  001264' 173000                          173000          ;M9301 = YB VERSION
   698  001266' 173000                          173000          ;M9301 = YC VERSION
   699  001270' 173000                          173000          ;M9400 = YA(OR YC) VERSION
   700  001272' 173000                          173000          ;M9301 = YF VERSION
   701  001274' 170000                          170000          ;M7942 = YB VERSION
   702  001276' 173000                          173000          ;M9301 = YD VERSION
   703  001300' 173000                          173000          ;M9400 = YH(OR YK) VERSION
   704  001302' 163000                          163000          ;M9311 VERSION
   705  001304' 173000                          173000          ;M9301 = YH VERSION
   706  001306' 173000                          173000          ;M9301 = YE VERSION
   707  001310' 173000                          173000          ;M9301 = YJ VERSION
   708  001312' 173000                          173000          ;M9301 = YN VERSION
   709  001314' 177777                          -1
   710  001316' 177777                          -1
   711  001320' 177777                          -1
   712  001322' 177777                          -1
   713  001324' 177777                          -1
   714
   715  001326' 177777                  TDLN2:  -1              ;TABLE OF THE LENGTH (BYTES) OF 2ND ROM ADDRESS SPACE
```



```
   716  001330' 001000                          1000            ;M9301 = YA VERSION
   717  001332' 001000                          1000            ;M9301 = YB VERSION
   718  001334' 001000                          1000            ;M9301 = YC VERSION
   719  001336' 001000                          1000            ;M9400 =YA(OR YC) VERSION
   720  001340' 001000                          1000            ;M9301 =YF VERSION
   721  001342' 000000                          0               ;M7942 = YB VERSION
   722  001344' 001000                          1000            ;M9301 = YD VERSION
   723  001346' 001000                          1000            ;M9400 = YH(OR YK) VERSION
   724  001350' 001000                          1000            ;M9311 VERSION
   725  001352' 000764                          764             ;M9301 = YH VERSION
   726  001354' 001000                          1000            ;M9301 = YE VERSION
   727  001356' 001000                          1000            ;M9301 = YJ VERSION
   728  001360' 001000                          1000            ;M9400 = YN VERSION
   729  001362' 177777                          -1
   730  001364' 177777                          -1
   731  001366' 177777                          -1
   732  001370' 177777                          -1
   733  001372' 177777                          -1
   734
   735  001374' 177777                  TRMSA2: -1              ;TABLE OF THE STARTING ADDRESS OF 2ND ROM ADDRESS SPACE
   736  001376' 165000                          165000          ;M9301 = YA VERSION
   737  001400' 165000                          165000          ;M9301 = YB VERSION
   738  001402' 165000                          165000          ;M9301 = YC VERSION
   739  001404' 165000                          165000          ;M9400 = YA(OR YC) VERSION
   740  001406' 165000                          165000          ;M9301 = YF VERSION
   741  001410' 000000                          0               ;M7942 = YB VERSION
   742
   743  001412' 165000                          165000          ;M9301 = YD VERSION
   744  001414' 165000                          165000          ;M9400 = YH(OR YK) VERSION
   745  001416' 166000                          166000          ;M9311 VERSION
   746  001420' 165000                          165000          ;M9301 = YH VERSION
   747  001422' 165000                          165000          ;M9301 = YE VERSION
   748  001424' 165000                          165000          ;M9301 = YJ VERSION
   749  001426' 165000                          165000          ;M9400 = YN VERSION
   750  001430' 177777                          -1
   751  001432' 177777                          -1
   752  001434' 177777                          -1
   753  001436' 177777                          -1
   754  001440' 177777                          -1
   755
   756  001442' 001446'                 ADR:    MES1
   757  001444' 177777                          177777
   758  001446' 051445  030522  047040  MES1:   .ASCIZ  /%SR1 NOT SET TO SELECT ROM'/
        001454' 052117  051440  052105
        001462' 052040  020117  042523
        001470' 042514  052103  051040
        001476' 046517  000047
   759                                          .EVEN
   760          000001                  .END
```

```
ACSR     000102R          CDATA$= 104412          HRDPAS  000050R          PRTY3 = 000140          STAT    000026R
ACTCRC   000242R          CH0     000404R         ICONT   000036R          PRTY4 = 000200          ST2     000272R
ACTLPC   000244R          CH1     000440R         ICOUNT  000040R          PRTY5 = 000240          SVR0    000062R
ADDR     000006R          CK1     000510R         IDNUM   000122R          PRTY6 = 000300          SVR1    000064R
ADDR22= 001000            CLLAST  000676R         INIT    000030R          PRTY7 = 000340          SVR2    000066R
ADR      001442R          CLP0    000744R         INTR    000120R          PS    = 177776          SVR3    000070R
ASB      000106R          CLP1    000756R         LPC     001036R          PSW   = 177776          SVR4    000072R
ASTAT    000104R          CLP2    001010R         LPC1    001044R          PUSH  = 005746          SVR5    000074R
AWAS     000110R          CL0     000574R         LPC2    001060R          PUSH2 = 024646          SVR6    000076R
BEGIN    000000R          CL1     000640R         MAP22$= 104416           RAND$ = 104417          SYSCNT  000052R
BIT0  = 000001            CL2     000662R         MES1    001446R          RANNUM  000054R         TDLN1   001212R
BIT1  = 000002            CL3     000614R         MODNAM  000000R          RESTRT  000252R         TDLN2   001326R
BIT10 = 002000            CONFIG  000056R         MODSP   000224R          RES1    000056R         TRMSA1  001260R
BIT11 = 004000            CPC     000566R         MSGN$ = 104403           RES2    000060R         TRMSA2  001374R
BIT12 = 010000            CSRA    000100R         MSGS$ = 104402           ROMSA1  000224R         TRPDFD= 000022
BIT13 = 020000            DATCK$= 104411          MSG$  = 104401           ROMSA2  000230R         TXCRC   001074R
BIT14 = 040000            DATER$= 104404          NULL  = 000000           RSTRT   000112R         TXLPC   001142R
BIT15 = 100000            DATLN1  000226R         OPEN  = 000000           R6    =%000006          TYPOUT  000250R
BIT2  = 000004            DATLN2  000232R         OTOA$ = 104420           R7    =%000007          VECTOR  000010R
BIT3  = 000010            DVID1   000014R         PARCNT  000246R          SBADR   000102R         WA$ADR  000104R
BIT4  = 000020            ENDIT$= 104413          PARITY  000734R          SOFCNT  000042R         WDFR    000116R
BIT5  = 000040            END$  = 104410          PASCNT  000034R          SOFER$= 104406          WDTO    000114R
BIT6  = 000100            ERRTYP  000106R         PASS    000560R          SOFPAS  000046R         XFLAG   000005R
BIT7  = 000200            EXCRC   000236R         PIRQ$ = 000004           SPOINT  000032R         XOR     001012R
BIT8  = 000400            EXIT$ = 104400          POPSP = 005726           SPSIZ = 000040          XORS    000234R
BIT9  = 001000            EXLPC   000240R         POPSP2= 022626           SR1     000016R         .     = 001502R
BREAK$= 104407            GETPA$= 104415          PRTY  = 000000           SR2     000020R
BR1      000012R          GWBUF$= 104414          PRTY0 = 000000           SR3     000022R
BR2      000013R          HRDCNT  000044R         PRTY1 = 000040           SR4     000024R
BTOD$ = 104421            HRDER$= 104405          PRTY2 = 000100           START   000252R

. ABS.  000000  000
        001502  001
```

```
 ERROR$ DETECTED:  0
 DEFAULT GLOBALS GENERATED:  0

 PACK:XBMIA0,PACK:XBMIA0=DDXCOM,PACK:XBMIA0
 RUN-TIME:  3  4  .4 SECOND$
 RUN-TIME RATIO:  47/8=5.4
 CORE USED:  7K  (13 PAGES)
```