```
                        4    * Adventures in Flatland
                        5    * FLATLANDP2 v2.0: second part article for supporting
                        6    * 65C02 instructions disassembly listing on
                        7    * enhanced and unenhanced Apple //e, and ][(+) even when
                        8    * the ROM monitor does´nt allow for such.
                        9    * v2.0 brings a 65C02 mini assembler for 2, 2+, original
                        10   * //e, original //c (mini-assembler from scratch) and on
                        11   * enhanced //e (mini-assembler there but only for 6502)
                        12   * Created under the creative commons
                        13   * Author: Benoit Gilon
                        14   * Designed sometime in 2017 (say august/september)
                        15   * Due to be published in OSB issue 1
                        16   * OSB (One Step Beyond) is a personal magazine
                        17   * (editor, publisher and staff all in one person) about
                        18   * personal computing.
                        19   * Parts of published code (ROM monitor extract)
                        20   * were/are copyrighted Apple Computer
                        21   * S. Wozniak, A. Baum, John A, R. Aurrichio, B. Stearns,
                        22   * E. Beernink, R. Williams
                        23
                        24   OPTBI    =     1          0 for DOS 3.3, 1 for ProDOS BI
                        25   * b0: not meaningful
                        26   * b1: mini assembler already there (but not 65C02)
                        27   * b2: 65C02 disassembly already there.
                        28   R2P      =     0          Apple 2 or 2plus
                        29   R2E      =     1          Original ROM //e
                        30   R2EE     =     2          Enhanced ROM //e
                        31   R2CO     =     4          Original ROM //c
                        32
                        33   ROMMODEL =     R2EE
                        34
                        35   * Monitor equates
                        36            DUMMY $3C
003C: 00                37   A1L      DS    1
003D: 00                38   A1H      DS    1
003E: 00 00             39   A2L      DS    2
0040: 00 00             40   A3L      DS    2
0042: 00                41   A4L      DS    1
0043: 00                42   A4H      DS    1
                        43            DEND
                        44   * Used by mini assembler
                        45   FMT      EQU   $44
                        46   L        EQU   $35
                        47   * Misc equates
                        48   PCL      EQU   $3A
                        49   LENGTH   EQU   $2F
                        50   INSDS2   EQU   $F88C
                        51   PCADJ    EQU   $F953
                        52   MOVE     EQU   $FE2C
                        53   GETLNZ   EQU   $FD67
                        54   ZMODE    EQU   $FFC7
                        55   GETNUM   EQU   $FFA7
                        56   TOSUB    EQU   $FFBE
                        57   MODE     EQU   $31
                        58   PROMPT   EQU   $33
                        59   YSAV     EQU   $34
                        60   BELL     EQU   $FF3A
                        61   A1PC     EQU   $FE75
                        62   PRBYTE   EQU   $FDDA
```

```
                    63   PRBL2    EQU   $F94A
                    64   MNEML    EQU   $F9C0
                    65   MNEMR    EQU   $FA00
                    66   LMNEM    EQU   $2C
                    67   RMNEM    EQU   $2D
                    68   FORMAT   EQU   $2E
                    69   COUT     EQU   $FDED
                    70   PRMN1    EQU   $F8F5
                    71   PRYX2    EQU   $FD96
                    72   PRBLNK   EQU   $F948
                    73   FMT2     EQU   $F9A6
                    74   SCRN2    EQU   $F879
                    75   IN       EQU   $0200
                    76   CURSUP   EQU   $FC1A
                    77
                    79   NMCMDS   =     $17
                    80   CHRTBL   EQU   $FFCC
                    81   CHAR1    EQU   $F9B4
                    82   CHAR2    EQU   $F9BA
                    92   NNBL     EQU   $FF13      Mini assembler ROM get next c
                    93   IDXMINI  =     3
                    95
                    97   * ProDOS BI equates
                    98   GETBUFR  EQU   $BEF5
                    99   FREBUFR  EQU   $BEF8
                   100   BHIMEM   EQU   $BEFB      Boot Himem value
                   101   IVERSION EQU   $BFFD      BI version number (=1 for 1.0 and
 1.1)
                   102   TRUECSW  EQU   $BE30      True character output routine ent
ry point
                   110   * My own equates
                   111   AUXPTR   EQU   $06
                   112
                   113   * Some helper macros
                   116   MSGBE    MAC
                   117            JSR   PRMSG
                   118            <<<
                   119
                   120   MSGP     MAC
                   121            LDX   #0
                   122            MSGBE ]1
                   123            <<<
                   124
                   125   STID     MAC
                   126            LDA   #]1
                   127            STA   ]2
                   128            LDA   #>]1
                   129            STA   ]2+1
                   130            <<<
                   131
                   133
                   134            ORG   $4000
                   135
                   136   * Ensure that this patch is suitable for the host Apple 2
                   137   * ROM model..
4000: 20 DA 43     138   SUITE    JSR   RECON
4003: A2 00        139            LDX   #M0-MESBASE
```

```
4005: C0 02     150           CPY   #2
4007: D0 10     156           BNE   :E
                157  * This patch might have been already installed.. Warn
                158  * the user if this is the case.
4009: A2 6B     159           LDX   #M1-MESBASE
400B: AD C1 9A  161           LDA   $9AC1
400E: C9 9A     162           CMP   #$9A
4010: 90 07     163           BCC   :E
4012: AD D1 9A  164           LDA   $9AD1
4015: C9 9A     165           CMP   #$9A
4017: B0 03     166           BCS   *+5
4019: 4C 22 44  172  :E       JMP   PRMSG
                173
401C: A9 03     175           LDA   #>$9A00-FNDVAR2
401E: 20 F5 BE  176           JSR   GETBUFR
4021: A2 AE     177           LDX   #M2-MESBASE
4023: B0 F4     178           BCS   :E
4025: 8D 6A 40  179           STA   :1+1
4028: A9 97     180           LDA   #>FNDVAR2
402A: 38        181           SEC
402B: ED 6A 40  182           SBC   :1+1
402E: 8D 6A 40  183           STA   :1+1
                199  * Relocate code (don´t move it yet)
4031: A9 DA     200           LDA   #AROMBA
4033: A0 40     201           LDY   #>AROMBA
4035: 85 3A     202  ]LOOP    STA   PCL
4037: C9 04     203           CMP   #FCODE-FNDVAR2+AROMBA
4039: 98        204           TYA
403A: E9 43     205           SBC   #>FCODE-FNDVAR2+AROMBA
403C: B0 35     206           BCS   :4
403E: 84 3B     207           STY   PCL+1
4040: A2 00     208           LDX   #0
4042: 20 8C F8  209           JSR   INSDS2
4045: A4 2F     210           LDY   LENGTH
4047: C0 02     211           CPY   #2
4049: D0 22     212           BNE   :3
404B: B1 3A     213           LDA   (PCL),Y
404D: AA        214           TAX
404E: 88        215           DEY
404F: B1 3A     216           LDA   (PCL),Y
4051: A8        217           TAY
4052: C9 C5     218           CMP   #FIN       Only addresses with range
4054: 8A        219           TXA
4055: E9 99     220           SBC   #>FIN      Must be < FIN to be relocated
4057: B0 14     221           BCS   :3
4059: C0 00     222           CPY   #FNDVAR2   And >= FNDVAR2
405B: 8A        223           TXA
405C: E9 97     224           SBC   #>FNDVAR2
405E: 90 0D     225           BCC   :3
4060: 98        226           TYA
4061: E9 00     227  :0       SBC   #0
4063: A0 01     228           LDY   #1
4065: 91 3A     229           STA   (PCL),Y
4067: C8        230           INY
4068: 8A        231           TXA
4069: E9 00     232  :1       SBC   #0
406B: 91 3A     233           STA   (PCL),Y
```

```
406D: 20 53 F9  234  :3       JSR   PCADJ      Adjust PCL to length byte
4070: 4C 35 40  235           JMP   ]LOOP
                236
                237  * Relocates some non trivial references (i.e.
                238  * table of internal addresses)
4073: A2 00     239  :4       LDX   #ADT1-ADB1-1
4075: A0 00     240           LDY   #0
4077: 38        241           SEC
4078: BD 30 45  243  ]LOOP    LDA   ADB2,X
407B: 85 06     254           STA   AUXPTR
407D: BD 31 45  255           LDA   ADT2,X
4080: 85 07     256           STA   AUXPTR+1
4082: B1 06     257           LDA   (AUXPTR),Y
4084: ED 6A 40  258           SBC   :1+1
4087: 91 06     259           STA   (AUXPTR),Y
4089: CA        260           DEX
408A: 10 EC     261           BPL   ]LOOP
                262
                264  * Doing some more adjustments for ProDOS 8 BI
                265  * Working with both BI 1.1 and BI 1.6
408C: AD C0 9A  266           LDA   $9AC0      ;REGSAV
408F: 8D DB 40  267           STA   PX+1+AROMBA-FNDVAR2
4092: AD C1 9A  268           LDA   $9AC1
4095: 8D DC 40  269           STA   PX+2+AROMBA-FNDVAR2
4098: AD E9 9A  270           LDA   $9AE9      ;REGRST
409B: 8D 00 41  271           STA   GF+1+AROMBA-FNDVAR2
409E: AD EA 9A  272           LDA   $9AEA
40A1: 8D 01 41  273           STA   GF+2+AROMBA-FNDVAR2
                275  * Now move the code
40A4: A9 00     276           LDA   #FNDVAR2
40A6: 38        277           SEC
40A7: 85 42     282           STA   A4L
40A9: A9 97     283           LDA   #>FNDVAR2
40AB: ED 6A 40  284           SBC   :1+1
40AE: 85 43     285           STA   A4L+1
                286           STID  AROMBA;A1L
                287           STID  FIN-1+AROMBA-FNDVAR2;A2L
40C0: A0 00     288           LDY   #0
40C2: 20 2C FE  289           JSR   MOVE
                291  * For ProDOS,  we install the patch right now..
40C5: A9 97     292           LDA   #>PX
40C7: 38        293           SEC
40C8: ED 6A 40  294           SBC   :1+1
40CB: 8D C1 9A  295           STA   $9AC1
40CE: 8D D1 9A  296           STA   $9AD1
40D1: A9 00     297           LDA   #PX
40D3: 8D C0 9A  298           STA   $9AC0
40D6: 8D D0 9A  299           STA   $9AD0
40D9: 60        300           RTS
                320
                322  * ProDOS BI origin setting
                324  AROMBA   ORG   $9700
                347  FNDVAR2
9700: 20 FF FF  349  PX       JSR   $FFFF      Will be updated while loading..
9703: A5 33     350           LDA   PROMPT
9705: C9 AA     354           CMP   #"*"
9707: D0 1C     355           BNE   GF
```

```
9709: BA        357           TSX
970A: E8        358           INX
970B: E8        359           INX
970C: A0 05     363           LDY   #5
970E: E8        364  ]LOOP    INX
970F: BD 00 01  365           LDA   $0100,X
9712: 59 2A 99  366           EOR   STKL,Y
9715: D0 0E     367           BNE   GF
9717: 88        368           DEY
9718: 10 F4     369           BPL   ]LOOP
971A: A9 99     370  E01      LDA   #>NXTITM-4
971C: 9D 00 01  371           STA   $0100,X
971F: CA        372           DEX
9720: A9 0F     373           LDA   #NXTITM-4
9722: 9D 00 01  374           STA   $0100,X
9725: 4C FF FF  376  GF       JMP   $FFFF      Will be updated while loading
                381
                392
                394  * Substitute for LDA MNEML,Y
9728: C0 F8     395  LBS01    CPY   #$FAB8-$F9C0
972A: B9 8C 98  396           LDA   NMEMNEML-$FAB8+$F9C0,Y
972D: B0 0D     397           BCS   :0
972F: B9 C0 F9  398           LDA   MNEML,Y
9732: D0 08     399           BNE   :0
9734: A9 1C     400           LDA   #$1C
9736: C0 10     401           CPY   #$D0-$C0
9738: F0 02     402           BEQ   :0
973A: A9 AD     403           LDA   #$AD
973C: 60        404  :0       RTS
                405  * Substitute for LDA MNEMR,Y
973D: C0 F8     406  LBS02    CPY   #$FAF8-$FA00
973F: B9 93 98  407           LDA   NMEMNEMR-$FAF8+$FA00,Y
9742: B0 0D     408           BCS   :0
9744: B9 00 FA  409           LDA   MNEMR,Y
9747: D0 08     410           BNE   :0
9749: A9 C4     411           LDA   #$C4
974B: C0 10     412           CPY   #$10-$00
974D: F0 02     413           BEQ   :0
974F: A9 06     414           LDA   #$06
9751: 60        415  :0       RTS
                416
9752: 98        417  NEWOPS   TYA
9753: A2 18     418           LDX   #INDX-OPTBL-1
9755: DD 92 99  419  ]LOOP    CMP   OPTBL,X
9758: F0 04     420           BEQ   :0
975A: CA        421           DEX
975B: 10 F8     422           BPL   ]LOOP
975D: 60        423           RTS
975E: BD AB 99  424  :0       LDA   INDX,X
9761: A0 00     425           LDY   #0
9763: 60        426           RTS
                427
9764: A6 3A     428  MINSDS1  LDX   PCL
9766: A4 3B     429           LDY   PCL+1
9768: 20 96 FD  430           JSR   PRYX2      Print address Y,A hexa
976B: 20 48 F9  431           JSR   PRBLNK     Followed by a blank
976E: A1 3A     432  MINSDS2  LDA   (PCL,X)
```

```
9770: A8        433           TAY
9771: 4A        434           LSR              ;Even/odd test
9772: 90 05     435           BCC   :E
9774: 6A        436           ROR
9775: B0 0C     437           BCS   MERR
9777: 29 87     438           AND   #$87       Mask bits
9779: 4A        439  :E       LSR
977A: AA        440           TAX
977B: BD 30 99  441           LDA   NFMT1,X
977E: 20 79 F8  442           JSR   SCRN2
9781: D0 04     443           BNE   GETFMT
9783: A0 FC     444  MERR     LDY   #$FC
9785: A9 00     445           LDA   #0
9787: AA        446  GETFMT   TAX
9788: BD 74 99  447           LDA   NFMT2,X
978B: 85 2E     448           STA   FORMAT
978D: 29 03     449           AND   #3
978F: 85 2F     450           STA   LENGTH
9791: 20 52 97  451           JSR   NEWOPS     get index for new opcodes
9794: F0 05     452           BEQ   GOTONE
9796: A5 2E     453           LDA   FORMAT
9798: 4C AF F8  454           JMP   $F8AF
979B: 60        455  GOTONE   RTS
                456
979C: 20 64 97  457  MINSTDSP JSR   MINSDS1    Get format and length bytes
979F: 48        458           PHA
97A0: B1 3A     459  ]LOOP    LDA   (PCL),Y
97A2: 20 DA FD  460           JSR   PRBYTE
97A5: A2 01     461           LDX   #1
97A7: 20 4A F9  462  ]JLOOP   JSR   PRBL2
97AA: C4 2F     463           CPY   LENGTH
97AC: C8        464           INY
97AD: 90 F1     465           BCC   ]LOOP
97AF: A2 03     466           LDX   #3
97B1: C0 04     467           CPY   #4
97B3: 90 F2     468           BCC   ]JLOOP
97B5: 68        469           PLA
97B6: A8        470           TAY
97B7: 20 28 97  471           JSR   LBS01
97BA: 85 2C     472           STA   LMNEM
97BC: 20 3D 97  473           JSR   LBS02
97BF: 85 2D     474           STA   RMNEM
97C1: 4C F5 F8  475           JMP   PRMN1
                476
97C4: 20 75 FE  477  MYLIST   JSR   A1PC       Move A1 (2 bytes) to PC if
97C7: A9 14     478           LDA   #$14       specified and disassemble 20
97C9: 48        479  ]LOOP    PHA
97CA: 20 9C 97  480           JSR   MINSTDSP
97CD: 20 53 F9  481           JSR   PCADJ      Adjust PC after each instr.
97D0: 85 3A     482           STA   PCL
97D2: 84 3B     483           STY   PCL+1
97D4: 68        484           PLA
97D5: 38        485           SEC
97D6: E9 01     486           SBC   #1         Next of 20 set of instructions
97D8: D0 EF     487           BNE   ]LOOP
97DA: 60        488  ]RET     RTS
                493
```

```
97DB: 85 33     494  LBS20    STA   PROMPT
97DD: 4C 67 FD  495           JMP   GETLNZ
                496
                497  MTOSUB   DO    ROMMODEL-R2CO
97E0: C0 0F     498           CPY   #$0F       Index for L command
97E2: F0 07     499           BEQ   :0
97E4: C0 03     501           CPY   #IDXMINI   "!" idx on all a2 platforms
97E6: F0 09     502           BEQ   :1
97E8: 4C BE FF  503           JMP   TOSUB
97EB: 20 C7 FF  505  :0       JSR   ZMODE
97EE: 4C C4 97  506           JMP   MYLIST
97F1: 20 C7 FF  508  :1       JSR   ZMODE
97F4: 4C 6B 98  509           JMP   MYMINI
                510
97F7: E9 81     511  REL      SBC   #$81       Is FMT compatible
97F9: 4A        512           LSR             ;with relative mode?
97FA: D0 14     513           BNE   ERR3       No
97FC: A4 3F     514           LDY   A2L+1
97FE: A6 3E     515           LDX   A2L        Double decrement
9800: D0 01     516           BNE   REL2
9802: 88        517           DEY
9803: CA        518  REL2     DEX
9804: 8A        519           TXA
9805: 18        520           CLC
9806: E5 3A     521           SBC   PCL        ;Form Addr - PC - 2
9808: 85 3E     522           STA   A2L
980A: 10 01     523           BPL   *+3
980C: C8        524           INY
980D: 98        525           TYA
980E: E5 3B     526           SBC   PCL+1
9810: D0 4A     527  ERR3     BNE   ERR
                528
9812: A4 2F     529  FINDOP   LDY   LENGTH
9814: B9 3D 00  530  ]LOOP    LDA   A1H,Y      ;Move instruction to PC
9817: 91 3A     531           STA   (PCL),Y
9819: 88        532           DEY
981A: 10 F8     533           BPL   ]LOOP
981C: 20 48 F9  536           JSR   PRBLNK     For enhanced //e
981F: 20 1A FC  538           JSR   CURSUP
9822: 20 1A FC  539           JSR   CURSUP
9825: 20 9C 97  540           JSR   MINSTDSP
9828: 20 53 F9  541           JSR   PCADJ      Update PC
982B: 84 3B     542           STY   PCL+1
982D: 85 3A     543           STA   PCL
982F: 4C 6B 98  544           JMP   NEXTLINE
9832: A5 3D     545  TRYNEXT  LDA   A1H        Get trial OpCode
9834: 20 70 97  546           JSR   MINSDS2+2
9837: A8        547           TAY
9838: 20 3D 97  549           JSR   LBS02
983B: C5 42     553           CMP   A4L
983D: D0 13     554           BNE   NEXTOP
983F: 20 28 97  556           JSR   LBS01
9842: C5 43     560           CMP   A4H
9844: D0 0C     561           BNE   NEXTOP
9846: A5 44     562           LDA   FMT
9848: A4 2E     563           LDY   FORMAT
984A: C0 9D     564           CPY   #$9D       Trial format relative?
```

```
984C: F0 A9     565           BEQ   REL         Yes
984E: C5 2E     566           CMP   FORMAT      Same format
9850: F0 C0     567           BEQ   FINDOP      Yes.
9852: C6 3D     568  NEXTOP   DEC   A1H         ;Try next trial OpCode
9854: D0 DC     569           BNE   TRYNEXT
9856: E6 44     570           INC   FMT         ;No more, try with LEN=2
9858: C6 35     571           DEC   L           Was L=2 already
985A: F0 D6     572           BEQ   TRYNEXT    No
                573
                574  * Mini assembler unrecognized instruction
985C: A4 34     575  ERR      LDY   YSAV
985E: 98        576  ERR2     TYA
985F: AA        577           TAX
9860: 20 4A F9  578           JSR   PRBL2
9863: A9 DE     579           LDA   #"^"
9865: 20 ED FD  580           JSR   COUT
9868: 20 3A FF  581  RESETZ   JSR   BELL
                582
                583  MYMINI
986B: A9 A1     584  NEXTLINE LDA   #"!"
986D: 20 DB 97  585           JSR   LBS20
9870: 20 C7 FF  586           JSR   ZMODE
9873: AD 00 02  587           LDA   IN
9876: C9 A0     588           CMP   #" "
9878: F0 12     589           BEQ   SPACE
987A: C9 8D     590           CMP   #$8D
987C: D0 01     591           BNE   *+3
987E: 60        592  ]RET     RTS
987F: 20 A7 FF  593           JSR   GETNUM      ;Get a number
9882: C9 93     594           CMP   #$93        ":" terminator
9884: D0 D8     595  ERR4     BNE   ERR2        No: error
9886: 8A        596           TXA               ;No address preceding ":"
9887: F0 D5     597           BEQ   ERR2
9889: 20 75 FE  598           JSR   A1PC        Move Address to PCL,PCH
988C: A9 03     599  SPACE    LDA   #3          Count of characters in mnem.
988E: 85 3D     600           STA   A1H
9890: 20 13 FF  601  NXTMN    JSR   GETNSP
9893: 0A        602  NXTM     ASL
9894: E9 BE     603           SBC   #$BE        Substract offset
9896: C9 C2     604           CMP   #$C2        Legal character?
9898: 90 C4     605           BCC   ERR2        No
989A: 0A        606           ASL               ;Compress left justify
989B: 0A        607           ASL
989C: A2 04     608           LDX   #4
989E: 0A        609  ]LOOP    ASL               ;Do 5 triple words shifts
989F: 26 42     610           ROL   A4L
98A1: 26 43     611           ROL   A4H
98A3: CA        612           DEX
98A4: 10 F8     613           BPL   ]LOOP
98A6: C6 3D     614           DEC   A1H         Done with 3 chars?
98A8: F0 F4     615           BEQ   ]LOOP       Yes, but do 1 more shift
98AA: 10 E4     616           BPL   NXTMN       No
98AC: A2 05     617  FORM1    LDX   #5          5 chars in addr mode
98AE: 20 13 FF  618  FORM2    JSR   GETNSP
98B1: 84 34     619           STY   YSAV
98B3: DD B4 F9  620           CMP   CHAR1,X     1st char match pattern?
98B6: D0 13     621           BNE   FORM3       No
```

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98B8: 20 13 FF  622           JSR   GETNSP     Yes: get 2nd character
98BB: DD BA F9  623           CMP   CHAR2,X    Match?
98BE: F0 0D     624           BEQ   FORM5       Yes
98C0: BD BA F9  625           LDA   CHAR2,X    No: is second half zero
98C3: F0 07     626           BEQ   FORM4       Yes
98C5: C9 A4     627           CMP   #$A4
98C7: F0 03     628           BEQ   FORM4
98C9: A4 34     629           LDY   YSAV
98CB: 18        630  FORM3    CLC               ;Clear bit means no match
98CC: 88        631  FORM4    DEY               ;Back 1 character
98CD: 26 44     632  FORM5    ROL   FMT         Form format byte
98CF: E0 03     633           CPX   #3          Time to check for Address
98D1: D0 0D     634           BNE   FORM7       No
98D3: 20 A7 FF  635           JSR   GETNUM      Yes
98D6: A5 3F     636           LDA   A2L+1
98D8: F0 01     637           BEQ   FORM6       High order byte zero
98DA: E8        638           INX               ;No, incr for 2-byte
98DB: 86 35     639  FORM6    STX   L
98DD: A2 03     640           LDX   #3          Reload format index
98DF: 88        641           DEY               ;Back 1 character
98E0: 86 3D     642  FORM7    STX   A1H         Save index
98E2: CA        643           DEX   Done        with format check?
98E3: 10 C9     644           BPL   FORM2
                645  * Important note: at this time A1H value is $FF
                646  * Will serve as Trial OpCode for next assembly step.
98E5: A5 44     647           LDA   FMT         Put length into the 2
98E7: 0A        648           ASL               ;lsb of FMT
98E8: 0A        649           ASL
98E9: 05 35     650           ORA   L
98EB: C9 20     651           CMP   #$20        Add "$" if non zero length
98ED: B0 06     652           BCS   FORM8       and don´t already have it
98EF: A6 35     653           LDX   L
98F1: F0 02     654           BEQ   FORM8
98F3: 09 80     655           ORA   #$80
98F5: 85 44     656  FORM8    STA   FMT
98F7: 84 34     657           STY   YSAV
98F9: B9 00 02  658           LDA   IN,Y
98FC: C9 BB     659           CMP   #";"        Start of comment?
98FE: F0 04     660           BEQ   FORM9
9900: C9 8D     661           CMP   #$8D
9902: D0 80     662           BNE   ERR4
9904: 4C 32 98  663  FORM9    JMP   TRYNEXT
                664
                681  GETNSP   EQU   NNBL
                683
9907: D8        684  MON      CLD
9908: 20 3A FF  685           JSR   BELL
990B: A9 AA     686  MONZ     LDA   #"*"
990D: 20 DB 97  687           JSR   LBS20
9910: 20 C7 FF  688           JSR   ZMODE
9913: 20 A7 FF  689  NXTITM   JSR   GETNUM
9916: 84 34     690           STY   YSAV
9918: A0 17     691           LDY   #NMCMDS
991A: 88        696  ]LOOP    DEY
991B: 30 EA     697           BMI   MON
991D: D9 CC FF  698           CMP   CHRTBL,Y
9920: D0 F8     699           BNE   ]LOOP
```

```
9922: 20 E0 97  700  :0       JSR   MTOSUB
9925: A4 34     701           LDY   YSAV
9927: 4C 13 99  702           JMP   NXTITM
                703
                704  FCODE    EQU   *
992A: FF 6F FD  705  STKL     HEX   FF6FFD77
992E: FD 37     707           HEX   FD37
9930: 0F 22 FF  712  NFMT1    HEX   0F22FF33CB62FF73
9938: 03 22 FF  713           HEX   0322FF33CB66FF77
9940: 0F 20 FF  714           HEX   0F20FF33CB60FF70
9948: 0F 22 FF  715           HEX   0F22FF39CB66FF7D
9950: 0B 22 FF  716           HEX   0B22FF33CBA6FF73
9958: 11 22 FF  717           HEX   1122FF33CBA6FF87
9960: 01 22 FF  718           HEX   0122FF33CB60FF70
9968: 01 22 FF  719           HEX   0122FF33CB60FF70
9970: 24 31 65  720           HEX   24316578
9974: 00 21 81  721  NFMT2    HEX   00218182594D9192
997C: 86 4A 85  722           HEX   864A859D495A
9982: 00        723           DS    1
9983: 00        724           HEX   00         Byte index $0F of NFMT2
9984: 8A 8B A5  725  NMEMNEML HEX   8A8BA5AC00
9989: 8A 8B     726           HEX   8A8B
998B: 74 74 76  727  NMEMNEMR HEX   747476C600
9990: 72 72     728           HEX   7272
9992: 12 14 1A  729  OPTBL    HEX   12141A1C32343A3C
999A: 52 5A 64  730           HEX   525A6472747A7C89
99A2: 92 9C 9E  731           HEX   929C9EB2D2F2FC
99A9: DA FA     732           HEX   DAFA
99AB: 38 FB 37  733  INDX     HEX   38FB37FB39213621
99B3: 3A F8 FA  734           HEX   3AF8FA3BFAF92221
99BB: 3C FA FA  735           HEX   3CFAFA3D3E3FFC
99C2: FD FE     736           HEX   FDFE
99C4: 00        737           HEX   00
                739  FIN      EQU   *
                740
99C5: 00 00 00  742           DS    \
                743           ERR   *-$9A00
                747           ORG
                748
43DA: A0 07     749  RECON    LDY   #8-1
43DC: AD B3 FB  750           LDA   $FBB3
43DF: 4D C0 FB  751           EOR   $FBC0
43E2: 4D BF FB  752           EOR   $FBBF
43E5: D9 3D 44  753  ]LOOP    CMP   MACMAT,Y
43E8: F0 04     754           BEQ   :1
43EA: 88        755           DEY
43EB: 10 F8     756           BPL   ]LOOP
43ED: C8        757           INY
43EE: C0 02     758  :1       CPY   #2
43F0: D0 23     759           BNE   :2
43F2: AD 5C FC  760           LDA   $FC5C
43F5: C9 EB     761           CMP   #$EB
43F7: D0 1C     762           BNE   :2
43F9: A0 08     763           LDY   #8
43FB: 18        764           CLC
43FC: FB        765           HEX   FB         65802 XCE
43FD: 08        766           PHP
```

```
43FE: C2 30      767           HEX   C230       65802 REP $30
4400: 20 1F FE   768           JSR   $FE1F
4403: 8C 32 45   769           STY   NEWY
4406: 28         770           PLP
4407: FB         771           HEX   FB
4408: A0 0C      772           LDY   #12
440A: AD 33 45   773           LDA   NEWY+1
440D: D0 06      774           BNE   :2
440F: AD 32 45   775           LDA   NEWY
4412: 09 08      776           ORA   #8
4414: A8         777           TAY
4415: B9 45 44   778  :2        LDA   MCODE,Y
4418: 8D 34 45   779           STA   MACHINE
441B: C0 01      780           CPY   #1
441D: 6A         781           ROR
441E: 8D 35 45   782           STA   MUL
4421: 60         783  ]RET     RTS
                 784
4422: BD 53 44   785  PRMSG     LDA   MESBASE,X
4425: F0 FA      786           BEQ   ]RET
4427: 20 2F 44   787           JSR   LBS10+2
442A: E8         788           INX
442B: D0 F5      789           BNE   PRMSG      Always
                 790
442D: 09 80      791  LBS10     ORA   #$80
442F: 2C 35 45   792           BIT   MUL
4432: 30 06      793           BMI   LBS11
4434: C9 E0      794           CMP   #$E0
4436: B0 02      795           BCS   LBS11
4438: 29 DF      796           AND   #$DF
443A: 6C 30 BE   797  LBS11     JMP   (TRUECSW)
                 798
443D: EA 2D E6   799  MACMAT    HEX   EA2DE6E7F9060502
4445: 00 40 41   800  MCODE     HEX   00404142808182 83C0C1C2C3C4C5
                 801  MESBASE
4453: 8D         802  M0        HEX   8D
4454: D4 E8 E5   803           ASC   "The target and host ROM models do not",8D
447A: ED E1 F4   804           ASC   "match. There is no need to install",8D
449D: AA F4 E8   805           ASC   "*this* patch on *this* comuter!",8D00
44BE: 8D         806  M1        HEX   8D
44BF: C9 F4 A0   807           ASC   "It seems that this patch or another",8D
44E3: F3 E9 ED   808           ASC   "similar is already installed",8D00
4501: 8D         810  M2        HEX   8D
4502: CE EF F4   811           ASC   "Not enough memory to install this",8D
4524: F0 E1 F4   812           ASC   "patch!",8D00
                 814           ERR   *-MESBASE/256
                 815
452C: DB         817  TABB1     DFB   PX+1+AROMBA-FNDVAR2 Pour REGSAV
452D: 40         818  TABT1     DFB   >PX+1+AROMBA-FNDVAR2 Pour REGSAV
                 819
452E: FB         821  ADB1      DFB   E01+7+AROMBA-FNDVAR2
452F: 40         826  ADT1      DFB   >E01+7+AROMBA-FNDVAR2
4530: F5         831  ADB2      DFB   E01+1+AROMBA-FNDVAR2
4531: 40         836  ADT2      DFB   >E01+1+AROMBA-FNDVAR2
                 841
4532: 00 00      842  NEWY      DS    2
4534: 00         843  MACHINE   DS    1
```

```
4535: 00        844  MUL      DS    1          b7 set iif no upper. case
                845
                857           SAV   FLATLANDP3EEP8

Object saved as FLATLANDP3EEP8,A$4000,L$0536


--End assembly, 1334 bytes, Errors: 0


Symbol table - alphabetical order:

   A1H     =$3D        A1L     =$3C        A1PC    =$FE75      A2L     =$3E
?  A3L     =$40        A4H     =$43        A4L     =$42        ADB1    =$452E
   ADB2    =$4530      ADT1    =$452F      ADT2    =$4531      AROMBA  =$40DA
   AUXPTR  =$06        BELL    =$FF3A   ?  BHIMEM  =$BEFB      CHAR1   =$F9B4
   CHAR2   =$F9BA      CHRTBL  =$FFCC      COUT    =$FDED      CURSUP  =$FC1A
   E01     =$971A      ERR     =$985C      ERR2    =$985E      ERR3    =$9810
   ERR4    =$9884      FCODE   =$992A      FIN     =$99C5      FINDOP  =$9812
   FMT     =$44     ?  FMT2    =$F9A6      FNDVAR2 =$9700   ?  FORM1   =$98AC
   FORM2   =$98AE      FORM3   =$98CB      FORM4   =$98CC      FORM5   =$98CD
   FORM6   =$98DB      FORM7   =$98E0      FORM8   =$98F5      FORM9   =$9904
   FORMAT  =$2E     ?  FREBUFR =$BEF8      GETBUFR =$BEF5      GETFMT  =$9787
   GETLNZ  =$FD67      GETNSP  =$FF13      GETNUM  =$FFA7      GF      =$9725
   GOTONE  =$979B      IDXMINI =$03        IN      =$0200      INDX    =$99AB
   INSDS2  =$F88C   ?  IVERSION=$BFFD      L       =$35        LBS01   =$9728
   LBS02   =$973D      LBS10   =$442D      LBS11   =$443A      LBS20   =$97DB
   LENGTH  =$2F        LMNEM   =$2C        M0      =$4453      M1      =$44BE
   M2      =$4501      MACHINE =$4534      MACMAT  =$443D      MCODE   =$4445
   MERR    =$9783      MESBASE =$4453      MINSDS1 =$9764      MINSDS2 =$976E
   MINSTDSP=$979C      MNEML   =$F9C0      MNEMR   =$FA00   ?  MODE    =$31
   MON     =$9907   ?  MONZ    =$990B      MOVE    =$FE2C   MD?MSGBE   =$8000
MD?MSGP    =$8000      MTOSUB  =$97E0      MUL     =$4535      MYLIST  =$97C4
   MYMINI  =$986B      NEWOPS  =$9752      NEWY    =$4532      NEXTLINE=$986B
   NEXTOP  =$9852      NFMT1   =$9930      NFMT2   =$9974      NMCMDS  =$17
   NMEMNEML=$9984      NMEMNEMR=$998B      NNBL    =$FF13      NXTITM  =$9913
?  NXTM    =$9893      NXTMN   =$9890      OPTBI   =$01        OPTBL   =$9992
   PCADJ   =$F953      PCL     =$3A        PRBL2   =$F94A      PRBLNK  =$F948
   PRBYTE  =$FDDA      PRMN1   =$F8F5      PRMSG   =$4422      PROMPT  =$33
   PRYX2   =$FD96      PX      =$9700      R2CO    =$04        R2E     =$01
   R2EE    =$02        R2P     =$00        RECON   =$43DA      REL     =$97F7
   REL2    =$9803   ?  RESETZ  =$9868      RMNEM   =$2D        ROMMODEL=$02
   SCRN2   =$F879      SPACE   =$988C   MD STID    =$8000      STKL    =$992A
?  SUITE   =$4000   ?  TABB1   =$452C   ?  TABT1   =$452D      TOSUB   =$FFBE
   TRUECSW =$BE30      TRYNEXT =$9832      YSAV    =$34        ZMODE   =$FFC7
V  ]JLOOP  =$97A7   V  ]LOOP   =$43E5   V  ]RET    =$4421


Symbol table - numerical order:

   R2P     =$00        OPTBI   =$01        R2E     =$01        R2EE    =$02
   ROMMODEL=$02        IDXMINI =$03        R2CO    =$04        AUXPTR  =$06
   NMCMDS  =$17        LMNEM   =$2C        RMNEM   =$2D        FORMAT  =$2E
   LENGTH  =$2F     ?  MODE    =$31        PROMPT  =$33        YSAV    =$34
   L       =$35        PCL     =$3A        A1L     =$3C        A1H     =$3D
   A2L     =$3E     ?  A3L     =$40        A4L     =$42        A4H     =$43
```

```
   FMT      =$44        IN       =$0200   MD?MSGBE    =$8000   MD?MSGP     =$8000
MD STID     =$8000   ?  SUITE    =$4000      AROMBA   =$40DA      RECON    =$43DA
V  ]LOOP    =$43E5   V  ]RET     =$4421      PRMSG    =$4422      LBS10    =$442D
   LBS11    =$443A      MACMAT   =$443D      MCODE    =$4445      MESBASE  =$4453
   M0       =$4453      M1       =$44BE      M2       =$4501   ?  TABB1    =$452C
?  TABT1    =$452D      ADB1     =$452E      ADT1     =$452F      ADB2     =$4530
   ADT2     =$4531      NEWY     =$4532      MACHINE  =$4534      MUL      =$4535
   FNDVAR2  =$9700      PX       =$9700      E01      =$971A      GF       =$9725
   LBS01    =$9728      LBS02    =$973D      NEWOPS   =$9752      MINSDS1  =$9764
   MINSDS2  =$976E      MERR     =$9783      GETFMT   =$9787      GOTONE   =$979B
   MINSTDSP=$979C   V  ]JLOOP   =$97A7      MYLIST   =$97C4      LBS20    =$97DB
   MTOSUB   =$97E0      REL      =$97F7      REL2     =$9803      ERR3     =$9810
   FINDOP   =$9812      TRYNEXT  =$9832      NEXTOP   =$9852      ERR      =$985C
   ERR2     =$985E   ?  RESETZ   =$9868      MYMINI   =$986B      NEXTLINE=$986B
   ERR4     =$9884      SPACE    =$988C      NXTMN    =$9890   ?  NXTM     =$9893
?  FORM1    =$98AC      FORM2    =$98AE      FORM3    =$98CB      FORM4    =$98CC
   FORM5    =$98CD      FORM6    =$98DB      FORM7    =$98E0      FORM8    =$98F5
   FORM9    =$9904      MON      =$9907   ?  MONZ     =$990B      NXTITM   =$9913
   FCODE    =$992A      STKL     =$992A      NFMT1    =$9930      NFMT2    =$9974
   NMEMNEML=$9984       NMEMNEMR=$998B      OPTBL    =$9992      INDX     =$99AB
   FIN      =$99C5      TRUECSW  =$BE30      GETBUFR  =$BEF5   ?  FREBUFR  =$BEF8
?  BHIMEM   =$BEFB   ?  IVERSION=$BFFD      SCRN2    =$F879      INSDS2   =$F88C
   PRMN1    =$F8F5      PRBLNK   =$F948      PRBL2    =$F94A      PCADJ    =$F953
?  FMT2     =$F9A6      CHAR1    =$F9B4      CHAR2    =$F9BA      MNEML    =$F9C0
   MNEMR    =$FA00      CURSUP   =$FC1A      GETLNZ   =$FD67      PRYX2    =$FD96
   PRBYTE   =$FDDA      COUT     =$FDED      MOVE     =$FE2C      A1PC     =$FE75
   NNBL     =$FF13      GETNSP   =$FF13      BELL     =$FF3A      GETNUM   =$FFA7
   TOSUB    =$FFBE      ZMODE    =$FFC7      CHRTBL   =$FFCC
```