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                0002  ; MODIFIED FOR 60K SYSTEM  03/25/84 MJV
                0003  ; MODIFIED FOR 59K SYSTEM  11/15/85 MJV
                0004  ;
                0005  ; ASMB BOOTX.AAA HEX DATE=111185 TIME=220000 XREF WIDTH=132
                0006  ;     .Z80
                0007  ; THIS IS THE BOOT LOADER FOR THE TRIPLE DENSE CP/M BIOS.  IT LOADS BIOS
                0008  ; FROM TRACK 0 AT THE ADDRESS SPECIFIED BY THE EQUATE BASE AND THEN JUMPS
                0009  ; TO COLD BOOT TO LOAD BDOS AND CCP.
                0010  ;
(FFFF)          0011  TRUE  EQU     0FFFFH          ; SET UP VALUE OF LOGICAL TRUE
(0000)          0012  FALSE EQU     NOT TRUE        ; SET UP VALUE OF LOGICAL FALSE
                0013  ;
(003B)          0014  MSIZE EQU     59              ; SYSTEM MEMORY SIZE
                0015  ;
(FFFF)          0016  MOVCPM        EQU     TRUE            ; DIGITAL RESEARCH'S STANDARD MOVCPM WAS USED
                0017                                ; TO SET UP BDOS AND CCP IF TRUE
(0000)          0018  MCPMDD        EQU     FALSE           ; MOVCPMDD WAS USED TO SET UP BDOS AND CCP IF
                0019                                ; TRUE
(0000)          0020  MVCPMO        EQU     FALSE           ; THE OLD MOVCPM WHICH SET UP BDOS AND CCP FOR
                0021                                ; THE ORIGIONAL TRIPLE DENSE BIOS WAS USED IF
                0022                                ; TRUE
(FFFF)          0023        IF      MOVCPM
(9C00)          0024  CBASE EQU     (MSIZE-20)*1024
                0025        ENDIF
(0000)          0026        IF      MCPMDD
                0027  CBASE EQU     ((MSIZE-20)*1024)-0100H
                0028        ENDIF
(0000)          0029        IF      MVCPMO
                0030  CBASE EQU     ((MSIZE-20)*1024)+0100H
                0031        ENDIF
(D000)          0032  CPMB  EQU     CBASE+03400H    ; START OF CP/M (CCP)
(D806)          0033  BDOS  EQU     CPMB+0806H      ; BDOS CALL ENTRY POINT IN CP/M
(E600)          0034  CBIOS EQU     CPMB+01600H     ; START OF BIOS IN CP/M
                0035  ;
(0002)          0036  MONOC EQU     02H             ; COMMAND TO SWITCH MONITOR PROM OUT AND
                0037                                ; SHADOW RAM IN
(007F)          0038  MONOP EQU     07FH            ; PORT ADDRESS TO SWITCH SD MONITOR ON AND OFF
                0039  ;
                0040  ; PORTS USED BY THE DISK CONTROLLER
                0041  ;
(0060)          0042  X     EQU     060H            ; DISK CONTROLLER PORTS BASE ADDRESS
(0063)          0043  SELECT        EQU     X+03H           ; DRIVE SELECT PORT
(0064)          0044  STATUS        EQU     X+04H           ; STATUS PORT
(0065)          0045  TRACK EQU     X+05H           ; TRACK PORT
(0066)          0046  SECTOR        EQU     X+06H           ; SECTOR PORT
(0067)          0047  DATA  EQU     X+07H           ; DATA PORT
(0064)          0048  CMD   EQU     X+04H           ; COMMAND PORT
                0049  ;
                0050  ;STEPR       EQU     01H             ; HEAD STEP RATE BITS FOR RESTORE, SEEK, STEP ^
                0051  ;                                   ; IN, AND STEP OUT COMMANDS (6 MSEC)       ^
(0000)          0052  STEPR EQU     00H             ; HEAD STEP RATE BITS FOR RESTORE, SEEK, STEP %
                0053                                ; IN, AND STEP OUT COMMANDS (3 MSEC)       %
(0004)          0054  DELYE1        EQU     04H             ; E BIT FOR READ AND WRITE COMMANDS TO DELAY
                0055                                ; 15 MSEC FOR HEAD LOAD
(001C)          0056  SKHDLD        EQU     01CH+STEPR      ; CONTROLLER COMMAND TO SEEK TRACK AND LOAD
                0057                                ; HEAD
(0088)          0058  RDSEC EQU     088H            ; CONTROLLER COMMAND TO READ SECTOR
(008C)          0059  RDSECD        EQU     088H+DELYE1     ; CONTROLLER COMMAND TO DELAY 15 MSEC THEN READ
                0060                                ; SECTOR
(0006)          0061  DENSB EQU     06H             ; DENSITY SELECT BIT NUMBER
                0062  ;
(007F)          0063  EWAITM        EQU     07FH            ; MASK TO ENABLE WAIT IN A SELECT COMMAND
(FF80)          0064  DWAITM        EQU     NOT EWAITM      ; MASK TO DISABLE WAIT IN A SELECT COMMAND
(0091)          0065  STERM EQU     091H            ; SEEK STATUS MASK TO CHECK NOT READY, SEEK
                0066                                ; ERROR, AND CONTROLLER BUSY
(009D)          0067  RDEM  EQU     09DH            ; READ STATUS MASK TO CHECK NOT READY, RECORD
                0068                                ; NOT FOUND, CRC ERROR, LOST DATA, AND BUSY
(00B0)          0069  CSELM EQU     0B0H            ; SELECT MASK TO DISABLE WAIT, SET SINGLE
                0070                                ; DENSITY, AND SIDE 1
                0071  ;
(0018)          0072  NSEC  EQU     018H            ; NUMBER OF SECTORS IN BIOS TO LOAD (24)
(0000)          0073  STRACK        EQU     00H             ; STARTING TRACK FOR BIOS LOAD
(0002)          0074  SSEC  EQU     02H             ; STARTING SECTOR FOR BIOS LOAD
(0002)          0075  STKSEC        EQU     (STRACK*256)+SSEC ; BIOS STARTING TRACK AND SECTOR
                0076  ;
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     (0080)      0077        ORG     080H           ; BOOT IS LOADED AT 80H BY SD MONITOR         %
                 0078  ;
                 0079  ;
0080  318001      0080  BOOT: LD      SP,BOOT+0100H  ; PUT STACK 100H BEYOND START OF BOOT
0083  3E02        0081        LD      A,MONOC        ; GET COMMAND TO SWITCH OUT SD MONITOR AND    %
                  0082                               ; SHADOW RAM IN                                  %
0085  D37F        0083        OUT     (MONOP),A      ; SWITCH OUT SD MONITOR AND SHADOW RAM IN     %
                  0084  ;     NOP                    ; 3E  PATCH AREA WHERE LD A,2 AND             ^
                  0085  ;     NOP                    ; 02                                      ^
                  0086  ;     NOP                    ; D3  OUT (07FH), A MAY BE STORED TO      ^
                  0087  ;     NOP                    ; 7F  SWITCH OUT SD MONITOR AND RAM IN           ^
0087  00          0088        NOP
0088  010200      0089        LD      BC,STKSEC      ; SET STARTING TRACK (0) AND SECTOR (2)
008B  1618        0090        LD      D,NSEC         ; SET NUMBER OF SECTORS TO LOAD
008D  2100E6      0091        LD      HL,CBIOS       ; GET BASE ADDRESS TO LOAD BIOS
0090  78          0092  NXTTK:        LD      A,B            ; TRACK NUMBER TO A
0091  D367        0093        OUT     (DATA),A       ; SET UP TRACK TO SEEK
0093  DB63        0094        IN      A,(SELECT)     ; GET STATUS SO DRIVE SELECTED BY
                  0095                               ; SD MONITOR IS USED
0095  E67F        0096        AND     EWAITM         ; ENABLE WAIT STATES                      ^
0097  F680        0097        OR      DWAITM         ; DISABLE WAIT STATES
0099  CBF7        0098        SET     DENSB,A        ; SET SINGLE DENSITY SELECT BIT
009B  D363        0099        OUT     (SELECT),A     ; SELECT BOOT DRIVE, SINGLE DENSITY
009D  3E1C        0100        LD      A,SKHDLD       ; SET SEEK, LOAD HEAD
009F  D364        0101        OUT     (CMD),A        ; SEND SEEK COMMAND
00A1  CDE400      0102        CALL    WAITST         ; WAIT FOR COMPLETION, SET WAIT STATE
                  0103                               ; ETC, RESELECT, AND GET STATUS
00A4  E691        0104        AND     STERM          ; ISOLATE NOT READY, SEEK ERROR, BUSY
00A6  204B        0105        JR      NZ,ERROR       ; GO SEE IF RETRY POSSIBLE, ERROR
00A8  79          0106        LD      A,C            ; NEXT SECTOR NUMBER TO A
00A9  CDC800      0107        CALL    READD          ; GO READ NEXT SECTOR
00AC  2045        0108  LOADLP:       JR      NZ,ERROR       ; GO SEE IF RETRY POSSIBLE, ERROR
00AE  15          0109        DEC     D              ; CHECK IF ALL BIOS SECTORS LOADED
00AF  CA00E6      0110        JP      Z,CBIOS        ; GO EXECUTE BIOS BOOT IF LOADED
00B2  0C          0111        INC     C              ; BUMP TO NEXT SECTOR
00B3  79          0112        LD      A,C            ; NEXT SECTOR TO A
00B4  FE1A        0113        CP      01AH           ; CHECK IF LAST SECTOR LOADED FROM TRACK
00B6  3805        0114        JR      C,GOREAD       ; GO LOAD NEXT IF NOT
00B8  0E01        0115        LD      C,001H         ; SET NEXT SECTOR TO 1
00BA  04          0116        INC     B              ; INCREMENT TRACK NUMBER
00BB  18D3        0117        JR      NXTTK          ; GO SEEK NEXT TRACK AND CONT. READ
00BD  CDC200      0118  GOREAD:       CALL    READ           ; READ SECTOR SPECIFIED IN A
00C0  18EA        0119        JR      LOADLP         ; GO CHECK FOR ERROR AND IF ALL LOADED
                  0120  ;
                  0121  ; READ SECTOR SPECIFIED IN A
                  0122  ;
00C2  D366        0123  READ: OUT     (SECTOR),A     ; OUTPUT NEXT SECTOR NUMBER TO READ
00C4  3E88        0124        LD      A,RDSEC        ; GET READ COMMAND, NO DELAY
00C6  1804        0125        JR      READ1          ; GO SEND READ COMMAND
                  0126  ;
                  0127  ; READ SECTOR IN A WITH A 15 MSEC DELAY
                  0128  ;
00C8  D366        0129  READD:        OUT     (SECTOR),A     ; OUTPUT NEXT SECTOR NUMBER TO READ
00CA  3E8C        0130        LD      A,RDSECD       ; GET READ COMMAND, 15 MSEC DELAY
                  0131  ;
                  0132  ; SEND READ COMMAND IN A
                  0133  ;
00CC  F5          0134  READ1:        PUSH    AF             ; SAVE READ COMMAND AND FLAGS
00CD  DB63        0135        IN      A,(SELECT)     ; GET SELECTED DRIVE
00CF  E67F        0136        AND     EWAITM         ; SET UP WAIT ENABLE
00D1  D363        0137        OUT     (SELECT),A     ; SELECT DRIVE
00D3  F1          0138        POP     AF             ; RESTORE COMMAND AND FLAGS
00D4  D364        0139        OUT     (CMD),A        ; SEND READ COMMAND
00D6  C5          0140        PUSH    BC             ; SAVE TRACK AND SECTOR
00D7  0680        0141        LD      B,080H         ; SET UP SECTOR BYTE COUNT
00D9  0E67        0142        LD      C,DATA         ; SET UP READ DATA PORT ADDRESS
00DB  EDB2        0143        INIR                   ; INPUT SECTOR OF BIOS TO NEXT ADDR
00DD  C1          0144        POP     BC             ; RESTORE TRACK AND SECTOR
00DE  CDE400      0145        CALL    WAITST         ; WAIT FOR NOT BUSY, RESET WAIT,
                  0146                               ; AND GET STATUS
00E1  E69D        0147        AND     RDEM           ; CHECK IF ANY ERRORS ON READ
00E3  C9          0148        RET
                  0149  ;
                  0150  ; WAIT FOR COMPLETION, SET WAIT ENABLE, AND GET OPERATION STATUS
                  0151  ;
00E4  DB64        0152  WAITST:       IN      A,(STATUS)     ; GET OPERATION STATUS
00E6  E601        0153        AND     001H           ; ISOLATE BUSY BIT
00E8  20FA        0154        JR      NZ,WAITST      ; GO CHECK STATUS AGAIN IF BUSY
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00EA  DB63        0155        IN      A,(SELECT)     ; GET SELECT STATUS
00EC  F6B0        0156        OR      CSELM          ; SET WAIT DISABLE, SINGLE DENSITY
                  0157                               ; SIDE 0
00EE  D363        0158        OUT     (SELECT),A     ; SEND SELECT CONFIGURATION
00F0  DB64        0159        IN      A,(STATUS)     ; GET OPERATION STATUS
00F2  C9          0160        RET
                  0161  ;
                  0162  ; ERROR ROUTINE, CHECK IF RETRY OK
                  0163  ;
00F3  3AFD00      0164  ERROR:        LD      A,(RETRY)      ; GET RETRY COUNT
00F6  3C          0165        INC     A              ; BUMP RETRY COUNT
00F7  32FD00      0166        LD      (RETRY),A      ; SAVE RETRY COUNT
00FA  2084        0167        JR      NZ,BOOT        ; GO RETRY BOOT IF COUNT NOT EXHAUSTED
00FC  76          0168        HALT                   ; HALT IF NO MORE RETRIES ALLOWED
00FD  F0          0169  RETRY:        DB      0F0H           ; ALLOW 16 RETRIES
00FE  (0000)      0170        END

Errors            0
Range Count       0

Symbol     Value  Defn  References

BDOS       D806   0033
BOOT       0080   0080  0080 0167
CBASE      9C00   0024  0032
CBIOS      E600   0034  0091 0110
CMD        0064   0048  0101 0139
CPMB       D000   0032  0033 0034
CSELM      00B0   0069  0156
DATA       0067   0047  0093 0142
DELYE1     0004   0054  0059
DENSB      0006   0061  0098
DWAITM     FF80   0064  0097
ERROR      00F3   0164  0105 0108
EWAITM     007F   0063  0064 0096 0136
FALSE      0000   0012  0018 0020
GOREAD     00BD   0118  0114
LOADLP     00AC   0108  0119
MCPMDD     0000   0018  0026
MONOC      0002   0036  0081
MONOP      007F   0038  0083
MOVCPM     FFFF   0016  0023
MSIZE      003B   0014  0024
MVCPMO     0000   0020  0029
NSEC       0018   0072  0090
NXTTK      0090   0092  0117
RDEM       009D   0067  0147
RDSEC      0088   0058  0124
RDSECD     008C   0059  0130
READ       00C2   0123  0118
READ1      00CC   0134  0125
READD      00C8   0129  0107
RETRY      00FD   0169  0164 0166
SECTOR     0066   0046  0123 0129
SELECT     0063   0043  0094 0099 0135 0137 0155 0158
SKHDLD     001C   0056  0100
SSEC       0002   0074  0075
STATUS     0064   0044  0152 0159
STEPR      0000   0052  0056
STERM      0091   0065  0104
STKSEC     0002   0075  0089
STRACK     0000   0073  0075
TRACK      0065   0045
TRUE       FFFF   0011  0012 0016
WAITST     00E4   0152  0102 0145 0154
X          0060   0042  0043 0044 0045 0046 0047 0048
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