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1  ; ASSEMBLER ASIDE 1.14
2  ; DTEST - Test Routines for CompuPro Disk Controller.
3  ; DISK TEST
4  ; COMPUPRO
5  ; Oakland Airport
6  ; Oak land , California 94611
7  ; Copyright 1981, CompuPro Corporation.
8  ; This product is a program product of CompuPro and is supplied for use with the
9  ; Version number: 1.1B Version date: April 13, 1981
10
11
12 BEGIN:      EQU      0100H
13 ;Assembly Constants
14 FDPOR:      EQU      0C0H      ; Base port address for Controller
15 FDOS:       EQU      FDPOR      ; Status register
16 FDOD:       EQU      FDPOR+1    ; Data register
17 FDMA:       EQU      FDPOR+2    ; DMA address (when write)
18 INTS:       EQU      FDPOR+2    ; Status Register (when read)
19 SER:        EQU      FDPOR+3    ; Serial port
20 ;Controller function definitions Specify (00) command
21 F_RTK:      =        02        ; Read track
22 F_SPEC:     =        03        ; Specify
23 F_DSTS:     =        04        ; Drive status
24 F_RDAT:     =        06        ; Read sector KM
25 F_DRDT:     =        46H       ; Read sector MFM
26 F_WRAT:     =        05        ; Write sector FM
27 F_WRD:      =        45H       ; Write sector MFM
28 F_RECA:     =        07        ; Recalibrate
29 F_RSTS:     =        08        ; Read status
30 F_SEEK:     =        0FH       ; Seek
31 SRT:        =        16-8      ; = Shugart 800s (8 ms)
32 ;           =        16-3      ; = Shugart 850s (3 ms)
33 ;           =        16-3      ; - Remex (3 ms)
34 HUT:        =        240/16    ; Head unload = 240 ms
35 HLT:        =        (35+1)/2  ; Head load = 35 ms
36 ND:         =        00        ; Set DMA mode
37 ;JUMP TABLE FOR ROUTINES
38 ;These routines are callable subroutines
39 ;require parameters passed in the "A" and "C" registers
40          ORG      BEGIN
41 START:
42          JP      DDMA      ; Load DMA address
43          JP      DSPEC     ; Specity drive stat
44          JP      RCAL      ; Recalibrate (treck 00)
45          JP      DSEEK     ; Seek a treck
46          JP      READS     ; Read sector (FM)
47          JP      DREADS    ; Read sector (MFM)
48          JP      WRS       ; Write sector (FM)
49          JP      DWRS      ; Write sector (MFM)
50 ;DMA address load routine using 16 bit value in HL register for the 24 bit DMA
51 DDMA:
52          LD      A,0        ; Extended address
53          OUT     (FDMA),A   ; Output
54          LD      A,H        ; High byte
55          OUT     (FDMA),A   ; Output
56          LD      A,L        ; Low byte
57          OUT     (FDMA),A   ; Output
58          RET
59
60 ;Drive Specify Command
61 DSPEC:
62          LD      B,LSPEC    ; 3 byte command
63          LD      DE,SPEC    ; Point to command bytes
64 SPEC1:
65          IN      A,(FDOS)    ; Get status
66          AND     0C0H       ;
67          CP      80H        ;
68          JP      NZ,SPEC1    ; If no master ready bit
69          LD      A,(DE)      ; Load command byte
70          OUT     (FDOD),A    ; To controller
71          INC     DE          ; Next byte
72          DEC     B           ; Dec. counter
73          JP      NZ,SPEC1    ; If more bytes
74          RET
75
76 ;Recalibrate drive (seek track 0)
77 RCAL:
78          LD      B,LRECAL    ; 2 byte command
79          LD      DE,RECAL    ; Point to command bytes
80 RCAL1:
81          IN      A,(FDOS)    ; Get status
82          AND     0C0H       ;
83          CP      80H        ;

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84      JP      NZ,RCAL1    ; If no master ready bit
85      LD      A,(DE)      ; Load command byte
86      OUT     (FDCD),A    ; To controller
87      INC     DE          ;
88      DEC     B           ;
89      JP      NZ,RCAL1    ; If more bytes
90      RET
91
92 ;Seek a Track with cylinder number in "A"
93
94 DSEEK:  LD     B,LSEEK    ; 3 byte command
95         LD     DE,SEEK    ; Point to command bytes
96         LD     (CYLD),A   ; Store cylinder ,
97 SEEK1:  IN     A,(FDCS)   ; Check status
98         AND    0C0H      ;
99         CP     80H       ;
100        JP     NZ,SEEK1   ; If not ready
101        LD     A,(DE)     ; Load command byte
102        OUT    (FDCD),A   ; To controller
103        INC    DE         ;
104        DEC    B          ;
105        JP     NZ,SEEK1   ; If more bytes
106        RET
107
108 ;
109 ;FM Sector read command with sector in "A" and cylinder in "C"
110 READS:  LD     B,LREAD    ; BYTE COMMAND
111         LD     DE,READ    ; Point to command bytes
112         LD     (RSEC),A   ; Store sector number
113         LD     A,C        ;
114         LD     (RSCYL),A  ; Store cylinder number
115 READ1:  IN     A,(FDCS)   ; Check status
116         OR     A          ;
117         JP     P,READ1   ; If no master ready bit
118         LD     A,(DE)     ; Load command byte
119         OUT    (FDCD),A   ; To controller
120         INC    DE         ;
121         DEC    B          ;
122         JP     NZ,READ1  ; If more bytes
123 READ2:  IN     A,(INTS)   ; Check interrupt status
124         OR     A          ; For read complete
125         JP     P,READ2   ; If not complete
126 READ3:  IN     A,(FDCS)   ; In status
127         OR     A          ;
128         JP     P,READ3   ; If not ready
129         IN     A,(FDCD)   ; Read result byte ST0
130         SUB    40H        ; Strip
131         LD     L,A        ; Save
132 READ4:  IN     A,(FDCS)   ; In status
133         OR     A          ;
134         JP     P,READ4   ; If not ready
135         IN     A,(FDCD)   ; Read result byte ST1
136         SUB    80H        ; Strip
137         LD     H,A        ; Save
138         LD     B,7-2      ; 5 more bytes)
139 READ5:  IN     A,(FDCS)   ; in status
140         OR     A          ;
141         JP     P,READ5   ; If not ready
142         IN     A,(FDCD)   ; Read result byte
143         DEC    B          ;
144         JP     NZ,READ5  ; WAIT, UNTIL ALL DONE
145         LD     A,L        ; Check results
146         OR     H          ;
147         RET     Z         ; Return no error
148         SCF             ; set carry
149         RET             ; Return from error
150
151 ;MFM Sector read command with sector in "A" and cylinder in "C"
152 DREADS: LD     B,DLREAD   ; 9 BYTE COMMAND
153         LD     DE,DREAD   ; Point to command bytes
154         LD     (DRSEC),A  ; Store sector number
155         LD     A,C        ;
156         LD     (DCYL),A   ; Store cylinder number
157 DREAD1: IN     A,(FDCS)   ; Check status
158         OR     A          ;

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167      JP      P,DREAD1    ; If no master ready bit
168      LD      A,(DE)      ; Load command byte
169      OUT     (FDCD),A    ; To controller
170      INC     DE          ;
171      DEC     B           ;
172      JP      NZ,DREAD    ; If more bytes
173      JP      READ2      ;
174
175 ;FM Sector write command with sector in "A" cylinder number in "C"
176 WRS:
177      LD      B,LWR       ; 9 byte command
178      LD      DE,WR       ; Point to command bytes
179      LD      (WSEC),A    ; Store sector number
180      LD      A,C         ;
181      LD      (WSCYL),A  ; Store cylinder number
182 WR1:
183      IN      A,(FDCS)    ; Check status
184      OR      A           ;
185      JP      P,WR1       ; If no master ready bit
186      LD      A,(DE)      ; Load command byte
187      OUT     (FDCD),A    ; To controller
188      INC     DE          ;
189      DEC     B           ;
190      JP      NZ,WR1      ; if more bytes
191      JP      READ1      ;
192
193 ;MFM Sector write command with sector in "A" and cylinder in "C"
194 DWRS:
195      LD      B,DLWR      ; 9 byte command
196      LD      DE,DWR      ; Point to command bytes
197      LD      (DWSEC),A   ; Store sector number
198      LD      A,C         ;
199      LD      (DWRCYL),A ; Store cylinder number
200 DWR1:
201      IN      A,(FDCS)    ; Check status
202      OR      A           ;
203      JP      P,DWR1     ; If no master ready bit
204      LD      A,(DE)      ; Load command byte
205      OUT     (FDCD),A    ; To controller
206      INC     DE          ;
207      DEC     B           ;
208      JP      NZ,DWR1    ; It more bytes
209      JP      READ2      ;
210
211 ;*****
212 ; Function data for controller
213 SPEC:  DEFB      F_SPEC ; Specify command
214        DEFB      (srt shl 4)+hut ; VFD      4+SRT,4.HUT
215        DEFB      (hlt shl 1)+nd ; VFD      7.HLT,1.ND
216
217 ;*****
218 ; ACT ASSEMBLER
219 ;
220 ;SPEC  DB      F$SPEC
221 ;/+    VFD      4\SRT,4\HUT
222 ;      db      (srt shl 4)+hut
223 ;/+    VFD      7\HLT,1\ND
224 ;      db      (hlt shl 1)+nd
225 ;LSPEC equ     $-SPEC
226 ;
227 ;
228 ;*****
229 LSPEC:  =      $-SPEC ;
230 RECAL:  DEFB      F_RECA,0 ; Recalibrate command
231 LRECAL: =      $-RECAL ;
232 SEEK:  DEFB      F_SEEK ; Seek command
233        DEFB      0 ;
234 CYLD:  DEFB      0 ;
235 LSEEK:  =      $-SEEK ;
236 READ:  DEFB      F_RDAT ; Read commaed (FM)
237        DEFB      0 ; hds,ds1,ds0
238 RSCYL:  DEFB      0 ; C cylinder info
239        DEFB      0 ; Head
240 RSEC:  DEFB      1 ; Record (first sector)
241        DEFB      0 ; N 128 BYTE SECTOR
242        DEFB      25 ; EOT (last sectors)
243        DEFB      7 ; GPL
244        DEFB      128 ; DTL
245 LREAD:  =      $-READ ;
246 DREAD:  DEFB      F_DRDT ; Read command (MFM)
247        DEFB      0 ; hds,ds1,ds0
248 DCYL:  DEFB      2 ; C = cylinder info
249        DEFB      0 ; Head

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250 DRSEC:    DEFB      1          ; Record (first sector)
251          DEFB      3          ; N 1024 BYTE SECTOR
252          DEFB      7          ; EOT (last sectors)
253          DEFB      35H        ; GPL
254          DEFB      0          ; DTL
255 DLREAD:    =          $-DREAD  ;
256 WR:        DEFB      F_WRAT    ; Write command (FM)
257          DEFB      0          ; hds,ds1,ds0
258 WSCYL:     DEFB      0          ; C = cylinder info Hds,ds1,ds0
259          DEFB      0          ; Head
260 WSEC:      DEFB      1          ; Record (first sector)
261          DEFB      0          ; N 128 BYTE SECTOR
262          DEFB      25         ; EOT (last sectors)
263          DEFB      7          ; GPL
264          DEFB      128        ; DTL
265 LWR:       =          $-WR      ;
266 DWR:       DEFB      F_WRDT    ; Write command (MFM)
267          DEFB      0          ; hds,ds1,ds0
268 DWRCYL:    DEFB      2          ; C = cylinder info
269          DEFB      0          ; Head
270 DWSEC:     DEFB      1          ; Record (first sector)
271          DEFB      3          ; N 1024 BYTE SECTOR
272          DEFB      7          ; EOT (last sectors)
273          DEFB      35H        ; GPL
274          DEFB      0          ; DTL
275
276 DLWR:      =          $-DWR     ;
277
278          END
279
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