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; ASSEMBLER ASIDE 1.14
; DTEST - Test Routines for CompuPro Disk Controller.
; DISK TEST
; COMPUPRO
; Oakland Airport
; Oak land , California 94611
; Copyright 1981, CompuPro Corporation.
; This product is a program product of CompuPro and is supplied for use with the
; Version number: 1.1B Version date: April 13, 1981

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BEGIN:      EQU      0100H
;Assembly Constants
FDPORT:     EQU      0C0H      ; Base port address for Controller
FDCS:       EQU      FDPORT      ; Status register
FD CD:      EQU      FDPORT+1    ; Data register
FDMA:       EQU      FDPORT+2    ; DMA address (when write)
INTS:       EQU      FDPORT+2    ; Status Register (when read)
SER:        EQU      FDPORT+3    ; Serial port
;Controller function definitions Specify (00) command
F_RTK:      =        02          ; Read track
F_SPEC:     =        03          ; Specify
F_DSTS:     =        04          ; Drive status
F_RDAT:     =        06          ; Read sector KM
F_DRDT:     =        46H         ; Read sector MFM
F_WRAT:     =        05          ; Write sector FM
F_WRDT:     =        45H         ; Write sector MFM
F_RECA:     =        07          ; Recalibrate
F_RSTS:     =        08          ; Read status
F_SEEK:     =        0FH         ; Seek
SRT:        =        16-8        ; = Shugart 800s (8 ms)
;          =        16-3        ; = Shugart 850s (3 ms)
;          =        16-3        ; - Remex (3 ms)
HUT:        =        240/16      ; Head unload = 240 ms
HLT:        =        (35+1)/2    ; Head load = 35 ms
ND:         =        00          ; Set DMA mode
;JUMP TABLE FOR ROUTINES
;These routines are callable subroutines
;require parameters passed in the "A" and "C" registers
ORG         BEGIN
START:
        JP      DDMA      ; Load DMA address
        JP      DSPEC     ; Specity drive stat
        JP      RCAL      ; Recalibrate (treck 00)
        JP      DSEEK     ; Seek a treck
        JP      READS     ; Read sector (FM)
        JP      DREADS    ; Read sector (MFM)
        JP      WRS       ; Write sector (FM)
        JP      DWRS      ; Write sector (MFM)
;DMA address load routine using 16 bit value in HL register for the 24 bit DMA
DDMA:
        LD      A,0         ; Extended address
        OUT     (FDMA),A    ; Output
        LD      A,H         ; High byte
        OUT     (FDMA),A    ; Output
        LD      A,L         ; Low byte
        OUT     (FDMA),A    ; Output
        RET
;Drive Specify Command
DSPEC:
        LD      B,LSPEC     ; 3 byte command
        LD      DE,SPEC     ; Point to command bytes
SPEC1:
        IN      A,(FDCS)    ; Get status
        AND     0C0H        ;
        CP      80H         ;
        JP      NZ,SPEC1    ; If no master ready bit
        LD      A,(DE)      ; Load command byte
        OUT     (FD CD),A    ; To controller
        INC     DE          ; Next byte
        DEC     B           ; Dec. counter
        JP      NZ,SPEC1    ; If more bytes
        RET
;Recalibrate drive (seek track 0)
RCAL:
        LD      B,LRECAL    ; 2 byte command
        LD      DE,RECAL    ; Point to command bytes
RCAL1:
        IN      A,(FDCS)    ; Get status
        AND     0C0H        ;
        CP      80H         ;

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        JP      NZ,RCAL1    ; If no master ready bit
        LD      A,(DE)      ; Load command byte
        OUT     (FDCD),A    ; To controller
        INC     DE          ;
        DEC     B           ;
        JP      NZ,RCAL1    ; If more bytes
        RET

;Seek a Track with cylinder number in "A"

DSEEK:   LD      B,LSEEK    ; 3 byte command
        LD      DE,SEEK    ; Point to command bytes
        LD      (CYLD),A    ; Store cylinder ,

SEEK1:   IN      A,(FDCS)    ; Check status
        AND     0C0H        ;
        CP      80H        ;
        JP      NZ,SEEK1    ; If not ready
        LD      A,(DE)      ; Load command byte
        OUT     (FDCD),A    ; To controller
        INC     DE          ;
        DEC     B           ;
        JP      NZ,SEEK1    ; If more bytes
        RET

;
;FM Sector read command with sector in "A" and cylinder in "C"
READS:   LD      B,LREAD    ; BYTE COMMAND
        LD      DE,READ    ; Point to command bytes
        LD      (RSEC),A    ; Store sector number
        LD      A,C        ;
        LD      (RSCYL),A  ; Store cylinder number

READ1:   IN      A,(FDCS)    ; Check status
        OR      A          ;
        JP      P,READ1    ; If no master ready bit
        LD      A,(DE)      ; Load command byte
        OUT     (FDCD),A    ; To controller
        INC     DE          ;
        DEC     B           ;
        JP      NZ,READ1    ; If more bytes

READ2:   IN      A,(INTS)    ; Check interrupt status
        OR      A          ; For read complete
        JP      P,READ2    ; If not complete

READ3:   IN      A,(FDCS)    ; In status
        OR      A          ;
        JP      P,READ3    ; If not ready
        IN      A,(FDCD)    ; Read result byte ST0
        SUB     40H        ; Strip
        LD      L,A        ; Save

READ4:   IN      A,(FDCS)    ; In status
        OR      A          ;
        JP      P,READ4    ; If not ready
        IN      A,(FDCD)    ; Read result byte ST1
        SUB     80H        ; Strip
        LD      H,A        ; Save
        LD      B,7-2      ; 5 more bytes)

READ5:   IN      A,(FDCS)    ; in status
        OR      A          ;
        JP      P,READ5    ; If not ready
        IN      A,(FDCD)    ; Read result byte
        DEC     B          ;
        JP      NZ,READ5    ; WAIT, UNTIL ALL DONE
        LD      A,L        ; Check results
        OR      H          ;
        RET     Z          ; Return no error
        SCF             ; set carry
        RET             ; Return from error

;MFM Sector read command with sector in "A" and cylinder in "C"
DREADS:  LD      B,DLREAD    ; 9 BYTE COMMAND
        LD      DE,DREAD    ; Point to command bytes
        LD      (DRSEC),A    ; Store sector number
        LD      A,C        ;
        LD      (DCYL),A    ; Store cylinder number

DREAD1:  IN      A,(FDCS)    ; Check status
        OR      A          ;

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        JP      P,DREAD1    ; If no master ready bit
        LD      A,(DE)      ; Load command byte
        OUT     (FDCCD),A   ; To controller
        INC     DE          ;
        DEC     B           ;
        JP      NZ,DREAD    ; If more bytes
        JP      READ2       ;

;FM Sector write command with sector in "A" cylinder number in "C"
WRS:
        LD      B,LWR       ; 9 byte command
        LD      DE,WR       ; Point to command bytes
        LD      (WSEC),A    ; Store sector number
        LD      A,C         ;
        LD      (WSCYL),A   ; Store cylinder number
WR1:
        IN      A,(FDCCS)   ; Check status
        OR      A           ;
        JP      P,WR1       ; If no master ready bit
        LD      A,(DE)      ; Load command byte
        OUT     (FDCCD),A   ; To controller
        INC     DE          ;
        DEC     B           ;
        JP      NZ,WR1      ; if more bytes
        JP      READ1       ;

;MFM Sector write command with sector in "A" and cylinder in "C"
DWRS:
        LD      B,DLWR      ; 9 byte command
        LD      DE,DWR      ; Point to command bytes
        LD      (DWSEC),A   ; Store sector number
        LD      A,C         ;
        LD      (DWRCYL),A  ; Store cylinder number
DWR1:
        IN      A,(FDCCS)   ; Check status
        OR      A           ;
        JP      P,DWR1      ; If no master ready bit
        LD      A,(DE)      ; Load command byte
        OUT     (FDCCD),A   ; To controller
        INC     DE          ;
        DEC     B           ;
        JP      NZ,DWR1     ; It more bytes
        JP      READ2       ;

;*****
; Function data for controller
SPEC:   DEFB     F_SPEC     ; Specify command
        DEFB     (srt shl 4)+hut    ;; VFD      4+SRT,4.HUT
        DEFB     (hlt shl 1)+nd     ;; VFD      7.HLT,1.ND

;*****
; ACT ASSEMBLER
;
;SPEC   DB       F$SPEC
; ;+      VFD     4\SRT,4\HUT
;         db      (srt shl 4)+hut
; ;+      VFD     7\HLT,1\ND
;         db      (hlt shl 1)+nd
;LSPEC   equ      $-SPEC
;
;*****
LSPEC:   =        $-SPEC    ;
RECAL:   DEFB     F_RECA,0   ; Recalibrate command
LRECAL:  =        $-RECAL   ;
SEEK:    DEFB     F_SEEK     ; Seek command
        DEFB     0          ;
CYLD:    DEFB     0          ;
LSEEK:   =        $-SEEK    ;
READ:    DEFB     F_RDAT     ; Read commaed (FM)
        DEFB     0          ; hds,ds1,ds0
RSCYL:   DEFB     0          ; C cylinder info
        DEFB     0          ; Head
RSEC:    DEFB     1          ; Record (first sector)
        DEFB     0          ; N 128 BYTE SECTOR
        DEFB     25         ; EOT (last sectors)
        DEFB     7          ; GPL
        DEFB     128        ; DTL
LREAD:   =        $-READ    ;
DREAD:   DEFB     F_DRDT     ; Read command (MFM)
        DEFB     0          ; hds,ds1,ds0
DCYL:    DEFB     2          ; C = cylinder info
        DEFB     0          ; Head

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DRSEC:  DEFB      1      ; Record (first sector)
        DEFB      3      ; N 1024 BYTE SECTOR
        DEFB      7      ; EOT (last sectors)
        DEFB     35H     ; GPL
        DEFB      0      ; DTL
DLREAD: = $-DREAD      ;
WR:      DEFB     F_WROT  ; Write command (FM)
        DEFB      0      ; hds,ds1,ds0
WSCYL:   DEFB      0      ; C = cylinder info Hds,ds1,ds0
        DEFB      0      ; Head
WSEC:    DEFB      1      ; Record (first sector)
        DEFB      0      ; N 128 BYTE SECTOR
        DEFB     25      ; EOT (last sectors)
        DEFB      7      ; GPL
        DEFB     128     ; DTL
LWR:     = $-WR        ;
DWR:     DEFB     F_WROT  ; Write command (MFM)
        DEFB      0      ; hds,ds1,ds0
DWRCYL:  DEFB      2      ; C = cylinder info
        DEFB      0      ; Head
DWSEC:   DEFB      1      ; Record (first sector)
        DEFB      3      ; N 1024 BYTE SECTOR
        DEFB      7      ; EOT (last sectors)
        DEFB     35H     ; GPL
        DEFB      0      ; DTL
DLWR:    = $-DWR      ;
        END

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