Apple II
Technical Notes

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Developer Technical Support

UniDisk 3.5
#4:   Accessing Macintosh Disks

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This Technical Note formerly discussed drive-specific SmartPort calls. These calls are now documented in the *Apple IIGS Firmware Reference*. This Note now describes how to access Macintosh disks from a UniDisk 3.5 disk drive, as this information was not documented in the manual.

Macintosh Disk Access

The disk data format used in the UniDisk 3.5 is essentially identical to that used for Macintosh disks. There are three notable differences between the two formats:

- Macintosh blocks are 524 bytes; UniDisk 3.5 blocks are 512 bytes.
- Macintosh MFS disks are single sided; UniDisk 3.5 disks are double sided. (Macintosh HFS disks are double sided.)
- The Macintosh uses a 2:1 physical block interleave; the UniDisk 3.5 uses a 4:1 interleave.

Accessing Blocks on a Macintosh Disk

Reading from a Macintosh disk is accomplished with the use of the READ command (as opposed to the READBLOCK command, which enforces 512 byte data.) A call to load block zero from the Macintosh disk in Unit #1 into memory at $2000 would look like this:

```
MacRead     JSR    Dispatch              ;Normal SmartPort Entry point
            DFB    $08                   ;Character READ command code
            DW     Cmd_List              ;The parameter list
            BCS    Error                 ;Optional error handling...
            ...
Cmd_List    DFB    $04                   ;CharRead has four parameters
            DFB    $01                   ;Unit number
            DW     $2000                 ;Buffer address
            DW     524                   ;Always transfer 524 bytes
            DFB    $00                   ;Block (lo)
            DFB    $00                   ;Block (med)
            DFB    $00                   ;Block (hi)
```

Writing to a Macintosh disk is accomplished with the use of the WRITE command. A call to write block zero to the Macintosh disk in Unit #1 with data at memory location $2000 would look like this:

```
MacWrite     JSR    Dispatch            ;Normal SmartPort Entry point
             DFB    $09                 ;Character WRITE command code
             DW     Cmd_List            ;The parameter list
             BCS    Error               ;Optional error handling...
```

The Cmd_List is the same as in the READ example.

Formatting Macintosh Disks

The formatting routine in the UniDisk 3.5 firmware can format single- or double-sided disks of variable physical block interleave. The parameters controlling the interleave and the number of disk sides are located in the controller's zero page and are set to defaults whenever the INIT call is issued to SmartPort. These parameters can be altered by using the SET_DOWN_ADR and DOWNLOAD subcalls of the CONTROL call. Once altered, the FORMAT call uses these values in the formatting process. These zero page locations and their values are detailed below:

Parameter	Location	Values
Interleave	$0062	$02 = Mac, $04 = UniDisk 3.5
DoubleSided	$0063	$00 = Single, $80 = Double-sided

The following code example formats the media in Unit #1 as a Macintosh disk:

```
MacFormat    JSR    Dispatch            ;Set address to patch interleave
             DFB    $04                 ;Control call (Set_Down_Adr)
             DW     Cmd_ListA           ;Parameter List
             BCS    Error
;
             JSR    Dispatch            ;Now patch the interleave byte
             DFB    $04                 ;Control call (DOWNLOAD)
             DW     Cmd_ListB           ;Parameter List
             BCS    Error
;
             JSR    Dispatch            ;Set address to patch single sided
             DFB    $04                 ;Control call (Set_Down_Adr)
             DW     Cmd_ListC           ;Parameter List
             BCS    Error
;
             JSR    Dispatch            ;Now patch the single sided byte
             DFB    $04                 ;Control call (DOWNLOAD)
             DW     Cmd_ListD           ;Parameter List
             BCS    Error
;
             JSR    Dispatch            ;Finally...
             DFB    $03                 ;This is the actual format call
             DW     Cmd_ListE           ;Parameter List
             BCS    Error
;
             RTS
```

The parameter lists are as follows:

```
Cmd_ListA    DFB    $03                ;All control calls are 3 parms long
             DFB    $01                ;Unit #1
             DW     Ctrl_ListA         ;This has the interleave address
             DFB    $06                ;Set_Down_Adr control code

Ctrl_ListA   DW     $02                ;Two bytes for download address
             DW     $0062              ;Interleave address

Cmd_ListB    DFB    $03                ;All control calls are 3 parms long
             DFB    $01                ;Unit #1
             DW     Ctrl_ListB         ;This has the interleave value
             DFB    $07                ;Download control code

Ctrl_ListB   DW     $01                ;Two bytes for download address
             DFB    $02                ;Mac Disk Interleave value

Cmd_ListC    DFB    $03                ;All control calls are 3 parms long
             DFB    $01                ;Unit #1
             DW     Ctrl_ListC         ;This has the sides byte address
             DFB    $06                ;Set_Down_Adr control code

Ctrl_ListC   DW     $02                ;Two bytes for download address
             DW     $0062              ;Interleave address

Cmd_ListD    DFB    $03                ;All control calls are 3 parms long
             DFB    $01                ;Unit #1
             DW     Ctrl_ListD         ;This has the sides value
             DFB    $07                ;Download control code

Ctrl_ListD   DW     $01                ;Two bytes for download address
             DFB    $00                ;Value for single sided disk

Ctrl_ListE   DFB    $01                ;Format call has just one parameter
             DFB    $01                ;Unit number
```

Note: You may encounter difficulties when switching 400K single-sided disks and 800K double-sided disks in the same drive. STATUS requests for the number of blocks on the disk in the drive are valid for the disk **last** accessed. Thus, when you READ from an 800K disk, eject it, and insert a 400K disk, a STATUS call will reveal a size of 800K until a READ or WRITE command is issued. Applications which intend to handle both 800K and 400K disks should do a READ before each STATUS call.

Further Reference
- *Apple IIGS Firmware Reference*
- *Apple IIc Technical Reference Manual, Second Edition*