

Appendix C

Disk, Partition and File Formats

When accessing the logical (DOS) tracks and sectors on the FD, it is important to remember that the track and sector layout is specific to the type of partition in which the access occurs. It is through this method that the FD is able to attain its high level of compatibility. Therefore, when accessing an Emulation Mode partition, the logical track and sector layout of the partition is identical to that of the drive that it emulates, no matter where the partition is physically located on the FD disk. Note: the physical tracks and sectors of an FD disk can be accessed only through the use of Burst or Job Queue commands (see the Command Reference section for more information on the physical access of FD disks).

This appendix details the physical layout of standard FD disk formats along with the logical (DOS) track and sector layout of each partition type, including the header, BAM and directory block locations. This appendix also provides information about the format of BAM and directory entries, as well as the format of different file types.

Physical Disk Formats

PHYSICAL TRACK AND SECTOR LAYOUT BY DISK FORMAT			
(All formats are double-sided)			
FORMAT	TRACKS	SECTORS	SECTOR SIZE
CMD/CBM 800K	0 through 79	1 through 10	512 bytes
CMD 1.60M	0 through 79	1 through 10	1024 bytes
CMD 3.20M	0 through 79	1 through 20	1024 bytes
IBM 720K	0 through 79	1 through 9	512 bytes
IBM 1.44M	0 through 79	1 through 18	512 bytes
IBM 2.88M	0 through 79	1 through 36	512 bytes

Figure C1

Partition and File Formats

Common Formats Used in all Partition Types

DIRECTORY FILE TABLE FORMAT (ALL PARTITION TYPES) 1541 & 1571 PARTITIONS - TRACK 18 SECTOR 1 1581 PARTITION - TRACK 40 SECTOR 3 NATIVE PARTITION - TRACK 1 SECTOR 34	
BYTE	DESCRIPTION
0	Track pointer to next directory block (0 indicates last block)
1	Sector pointer to next directory block (255 indicates last block)
2-31	File entry 1 (see Figure C3)
32-33	Two zero (0) bytes (reserved)
34-63	File entry 2 (see Figure C3)
64-65	Two zero (0) bytes (reserved)
66-95	File entry 3 (see Figure C3)
96-97	Two zero (0) bytes (reserved)
98-127	File entry 4 (see Figure C3)
128-129	Two zero (0) bytes (reserved)
130-159	File entry 5 (see Figure C3)
160-161	Two zero (0) bytes (reserved)
162-191	File entry 6 (see Figure C3)
192-193	Two zero (0) bytes (reserved)
194-223	File entry 7 (see Figure C3)
224-225	Two zero (0) bytes (reserved)
226-255	File entry 8 (see Figure C3)

Figure C2

DIRECTORY FILE ENTRY FORMAT ALL PARTITION TYPES AND NATIVE MODE SUBDIRECTORIES		
BYTE	VALUE	DESCRIPTION
0	0 1 2 3 4 5 6	File type: DEL (Deleted) SEQ (Sequential) PRG (Program) USR (User) REL (Relative) CBM (1581 style sub-partition) DIR (Native Mode subdirectory) Note: Filetypes are OR'ed with \$80 if the file has been properly closed. Filetypes are OR'ed with \$C0 if the file is locked.
1		Track pointer to first data block (or header block if filetype is DIR)
2		Sector pointer to first data block (or header block if filetype is DIR)
3-18		Filename padded with shifted spaces (\$A0)
19		Pointer to starting track of side sector or super side sector if filetype is REL
20		Pointer to starting sector of side sector or super side sector if filetype is REL
21		Record length if filetype is REL
22	0	Reserved
23		Year file was created (last two digits)
24		Month file was created
25		Day file was created
26		Hour file was created
27		Minute file was created
28		Number of blocks used by file (low byte)
29		Number of blocks used by file (high byte)

Figure C3

1541 and 1571 Emulation Mode Partitions

SECTORS PER TRACK (1541 EMULATION MODES)		
TRACK RANGE	SECTORS AVAILABLE	TOTAL
1 through 17	0 through 20	21
18 through 24	0 through 18	19
25 through 30	0 through 17	18
31 through 35	0 through 16	17

Figure C4

SECTORS PER TRACK (1571 EMULATION MODE)		
TRACK RANGE	SECTORS AVAILABLE	TOTAL
1 through 17	0 through 20	21
18 through 24	0 through 18	19
25 through 30	0 through 17	18
31 through 35	0 through 16	17
36 through 52	0 through 20	21
53 through 59	0 through 18	19
60 through 65	0 through 17	18
66 through 70	0 through 16	17

Figure C5

HEADER & BAM (1541 & 1571 EMULATION MODES) TRACK 18 SECTOR 0		
BYTE	VALUE	DESCRIPTION
0	18	Track pointer to first directory block
1	1	Sector pointer to first directory block
2	65	ASCII 'A' for format type
3	0	1541 Emulation Mode
	128	1571 Emulation Mode
4-143		BAM (Block Availability Map)
144-161		Disk name padded with shifted spaces
162-163		Disk ID
164	160	Shifted Space for separator
165	50	ASCII '2' for DOS version
166	65	ASCII 'A' for format type
167-170	160	Shifted spaces for separators
171-220	0	Null bytes - reserved
221-255	0	1541 Emulation mode - Null bytes - reserved 1571 Emulation mode - Number of sectors available for tracks 36 through 70 - one byte per track (part of 1571 (side 2) BAM)

Figure C6

BAM for 1571 (side 2) EMULATION MODE TRACK 53 SECTOR 0		
BYTE	VALUE	DESCRIPTION
0-104		BAM for tracks 36 through 70 (3 bytes per track)
105-255	0	Null bytes - reserved

Figure C7

BAM ENTRY FORMAT 1541 & 1571 (side 1) EMULATION MODES Format of bytes 4-143 in Track 18 Sector 0 (Figure C6) 4 bytes per track: bytes 4-7 cover track 1, bytes 8-11 cover track 2, ...	
BYTE	DESCRIPTION
0	Number of sectors available on track
1	Block Availability for sectors 0 - 7
2	Block Availability for sectors 8 - 15
3	Block Availability for sectors 16 - 23
Notes: The lowest bit (LSB) in each byte (bytes 1 through 3) indicates the status of the lowest sector covered by that byte. A binary value of 1 indicates that the sector is available, while a value of 0 indicates that the sector is allocated.	

Figure C8

BAM ENTRY FORMAT 1571 (side 2) EMULATION MODE Format of bytes 0 - 104 on Track 53 Sector 0 (Figure C7) 3 bytes per track: bytes 0-2 cover track 36, bytes 3-5 cover track 37, ...	
BYTE	DESCRIPTION
0	Block Availability for sectors 0 - 7
1	Block Availability for sectors 8 - 15
2	Block Availability for sectors 16 - 23
Notes: The lowest bit (LSB) in each byte (bytes 0 through 2) is used to indicate the status of the lowest sector covered by that byte. A binary value of 1 indicates that the sector is available, while a value of 0 indicates that the sector is allocated. The associated byte for the number of sectors available on each track is stored in bytes 221 through 225 of track 18 sector 0 (see Figure C6).	

Figure C9

1581 Emulation Mode Partitions

SECTORS PER TRACK		
TRACK RANGE	SECTORS AVAILABLE	TOTAL
1 through 80	0 through 39	40

Figure C10

DIRECTORY HEADER TRACK 40 SECTOR 0		
BYTE	VALUE	DESCRIPTION
0	40	Track pointer to first directory block
1	3	Sector pointer to first directory block
2	68	ASCII 'D' for format type
3	0	Reserved
4-21		Disk name padded with shifted spaces
22-23		Disk ID
24	160	Shifted Space for separator
25	51	ASCII '3' for DOS version
26	68	ASCII 'D' for format type
27-28	160	Shifted spaces for separators
29-255	0	Null bytes - reserved

Figure C11

BAM BLOCK1 TRACK 40 SECTOR 1		
BYTE	VALUE	DESCRIPTION
0	40	Track pointer to next BAM block
1	2	Sector pointer to next BAM block
2	68	ASCII 'D' for DOS version
3	187	Complement of version number
4-5		Disk ID
6	192	Not used in FD - set to 1581 default value
7	0	Bit 6 - Flag for Auto Loader file
8-15	0	Reserved
16-255		BAM for tracks 1 through 40 (6 bytes per track)

Figure C12

BAM 2 TRACK 40 SECTOR 2		
BYTE	VALUE	DESCRIPTION
0	0	Indicates last sector for BAM
1	255	Indicates all bytes in sector used
2	68	ASCII 'D' for DOS version (copy)
3	187	Complement of version number (copy)
4-5		Disk ID (copy)
6	192	Not used in FD - set at 1581 default value
7	0	Bit 6 - Flag for Auto Loader file
8-15	0	Reserved
16-255		BAM for tracks 41 through 80 (6 bytes per track)

Figure C13

BAM ENTRY FORMAT	
Format of bytes 16 - 255 in Track 40 Sectors 1 and 2 (Figures C12 & C13)	
BYTE	DESCRIPTION
0	Number of sectors available on track
1	Block Availability for sectors 0 - 7
2	Block Availability for sectors 8 - 15
3	Block Availability for sectors 16 - 23
4	Block Availability for sectors 24 - 31
5	Block Availability for sectors 32 - 39
Notes: The lowest bit (LSB) in each byte (bytes 1 through 5) indicates the status of the lowest sector covered by that byte. A binary value of 1 indicates that the sector is available, while a value of 0 indicates that the sector is allocated.	

Figure C14

Native Mode Partitions

SECTORS PER TRACK		
TRACK RANGE	SECTORS AVAILABLE	TOTAL
1 through 255	0 through 255	256

Figure C15

Partition and File Formats

ROOT DIRECTORY AND SUBDIRECTORY HEADER TRACK 1 SECTOR 1 FOR ROOT DIRECTORY VARIES FOR SUBDIRECTORIES		
BYTE	VALUE	DESCRIPTION
0		Track pointer to first directory block
1		Sector pointer to first directory block
2	72	ASCII 'H' for format type
3	0	Reserved
4-21		Disk name padded with shifted spaces
22-23		Disk ID
24	160	Shifted space for separator
25	49	ASCII '1' for DOS version
26	72	ASCII 'H' for format type
27-28	160	Shifted spaces for separators
29-31	0	Reserved
32	1	Pointer to ROOT header track
33	1	Pointer to ROOT header sector
34		Track pointer to DIR PARENT header
35		Sector pointer to DIR PARENT header
36		Track pointer to DIR entry in PARENT directory
37		Sector pointer to DIR entry in PARENT directory
38		Index to starting byte of DIR entry in PARENT directory
39-255	0	Null bytes - reserved

Figure C16

NATIVE MODE BAM (1st BAM block) TRACK 1 SECTOR 2		
BYTE	VALUE	DESCRIPTION
0	0	Reserved
1	0	Reserved
2	72	ASCII 'H' for format type
3	183	Complement of format type
4-5		Disk ID
6	192	Not used in FD - set at 1581 default value
7	0	Not used
8		Track number of last available track in partition
9-31	0	Reserved
32-255	0	BAM for tracks 1 through 7 (32 bytes per track)

Figure C17

NATIVE MODE BAM (blocks 2-32) TRACK 1 SECTORS 3 - 28		
TRACK	SECTOR	DESCRIPTION
1	3	BAM for tracks 8 through 15 (32 bytes per track)
1	4	BAM for tracks 16 through 23 (32 bytes per track)
1	5	BAM for tracks 24 through 31 (32 bytes per track)
1	6	BAM for tracks 32 through 39 (32 bytes per track)
1	7	BAM for tracks 40 through 47 (32 bytes per track)
1	8	BAM for tracks 48 through 55 (32 bytes per track)
1	9	BAM for tracks 56 through 63 (32 bytes per track)
1	10	BAM for tracks 64 through 71 (32 bytes per track)
1	11	BAM for tracks 72 through 79 (32 bytes per track)
1	12	BAM for tracks 80 through 87 (32 bytes per track)
1	13	BAM for tracks 88 through 95 (32 bytes per track)
1	14	BAM for tracks 96 through 103 (32 bytes per track)
1	15	BAM for tracks 104 through 111 (32 bytes per track)
1	16	BAM for tracks 112 through 119 (32 bytes per track)
1	17	BAM for tracks 120 through 127 (32 bytes per track)
1	18	BAM for tracks 128 through 135 (32 bytes per track)
1	19	BAM for tracks 136 through 143 (32 bytes per track)
1	20	BAM for tracks 144 through 151 (32 bytes per track)
1	21	BAM for tracks 152 through 159 (32 bytes per track)
1	22	BAM for tracks 160 through 167 (32 bytes per track)
1	23	BAM for tracks 168 through 175 (32 bytes per track)
1	24	BAM for tracks 176 through 183 (32 bytes per track)
1	25	BAM for tracks 184 through 191 (32 bytes per track)
1	26	BAM for tracks 192 through 199 (32 bytes per track)
1	27	BAM for tracks 200 through 207 (32 bytes per track)
1	28	BAM for tracks 208 through 215 (32 bytes per track)
1	29	BAM for tracks 216 through 223 (32 bytes per track)
1	30	BAM for tracks 224 through 231 (32 bytes per track)
1	31	BAM for tracks 232 through 239 (32 bytes per track)
1	32	BAM for tracks 240 through 247 (32 bytes per track)
1	33	BAM for tracks 248 through 255 (32 bytes per track)

Figure C18

Partition and File Formats

NATIVE MODE BAM ENTRY FORMAT	
Format of bytes 32 - 255 in Track 1 Sector 2 and bytes 0 - 255 in Track 1 Sectors 3 - 33 (Figures C12 & C13)	
BYTE	DESCRIPTION
0	Block Availability for sectors 0 - 7
1	Block Availability for sectors 8 - 15
2	Block Availability for sectors 16 - 23
3	Block Availability for sectors 24 - 31
4	Block Availability for sectors 32 - 39
5	Block Availability for sectors 40 - 47
6	Block Availability for sectors 48 - 55
7	Block Availability for sectors 56 - 63
8	Block Availability for sectors 64 - 71
9	Block Availability for sectors 72 - 79
10	Block Availability for sectors 80 - 87
11	Block Availability for sectors 88 - 95
12	Block Availability for sectors 96 - 103
13	Block Availability for sectors 104 - 111
14	Block Availability for sectors 112 - 119
15	Block Availability for sectors 120 - 127
16	Block Availability for sectors 128 - 135
17	Block Availability for sectors 136 - 143
18	Block Availability for sectors 144 - 151
19	Block Availability for sectors 152 - 159
20	Block Availability for sectors 160 - 167
21	Block Availability for sectors 168 - 175
22	Block Availability for sectors 176 - 183
23	Block Availability for sectors 184 - 191
24	Block Availability for sectors 192 - 199
25	Block Availability for sectors 200 - 207
26	Block Availability for sectors 208 - 215
27	Block Availability for sectors 216 - 223
28	Block Availability for sectors 224 - 231
29	Block Availability for sectors 232 - 239
30	Block Availability for sectors 240 - 247
31	Block Availability for sectors 248 - 255
Notes: The lowest bit (LSB) in each byte (bytes 0 through 31) indicates the status of the highest sector covered by that byte. A binary value of 1 indicates that the sector is available, while a value of 0 indicates that the sector is allocated.	

Figure C19

File Formats

PROGRAM FILE FORMAT	
BYTE	DESCRIPTION
0	Pointer to track of next file block (contains a zero if current block is last block in file).
1	Pointer to sector of next file block (contains pointer to last byte used if current block is last block in file).
2-255	Program data (bytes 2 and 3 contain load address of program in low byte-high byte format if current block is first block in file).

Figure C20

SEQUENTIAL FILE FORMAT	
BYTE	DESCRIPTION
0	Pointer to track of next file block (contains a zero if current block is last block in file).
1	Pointer to sector of next file block (contains pointer to last byte used if current block is last block in file).
2-255	Data bytes .

Figure C21

RELATIVE FILE DATA BLOCK FORMAT	
BYTE	DESCRIPTION
0	Pointer to track of next data file block (contains a zero if current block is last data block in file).
1	Pointer to sector of next data file block (contains pointer to last byte used if current block is last data block in file).
2-255	Data bytes .Empty records will begin with a \$FF in the first byte of the record, the remaining bytes will contain \$00 bytes. Partially filled records will also contain \$00 bytes in the unused portion of the record.

Figure C22

RELATIVE FILE SUPER SIDE SECTOR BLOCK FORMAT	
BYTE	DESCRIPTION
0	Pointer to track of first side sector in first group (group 0).
1	Pointer to sector of first side sector in first group (group 0).
2	Super side sector identification byte (\$FE)
3-254	Track and sector pointers to first side sector of 126 groups (groups 0 through 125, two bytes per pointer). Unused group pointers contain \$00 bytes.

Figure C23

Partition and File Formats

RELATIVE FILE SIDE SECTOR BLOCK FORMAT	
BYTE	DESCRIPTION
0	Pointer to track of next side sector in this group (contains a zero if current block is last side sector block in use).
1	Pointer to sector of next side sector in this group (contains pointer to last byte used if current block is last side sector block in use).
2	Side sector number (0 - 5)
3	Record length of associated relative file
4	Pointer to track of first side sector in this group (number 0).
5	Pointer to sector of first side sector in this group (number 0).
6-7	Pointer to track and sector of second side sector in this group (number 1).
8-9	Pointer to track and sector of third side sector in this group (number 2).
10-11	Pointer to track and sector of fourth side sector in this group (number 3).
12-13	Pointer to track and sector of fifth side sector in this group (number 4).
14-15	Pointer to track and sector of sixth side sector in this group (number 5).
16-255	Track and sector pointers to 120 data blocks (two bytes per pointer). Unused data block pointers contain \$00 bytes.

Figure C24