3.1.1 Disk organisation and format

3.1.1.1 Unit numbers

The unit numbers of the 4 units connected must be different as far as the lower 2 bits are concerned:

Unit 0: XX00
Unit 1: XX01
Unit 2: XX10
Unit 3: XX11

(XX11: the two X's are binary values)

3.1.1.2 Volume organisation

Each disk volume is divided into a number of cylinders, each of which consists of one or more tracks. A track is divided into 32 sectors of fixed length, with sector 0 beginning at the index mark ([1] and [2]).
All the sectors of a volume are considered following each other in one sequence. Thus the sector number is least significant, head number next, and cylinder number is most significant. The number of tracks per cylinder (equals number of heads) varies with the drive version, see app. B. Sectors are numbered 0 through 31. Head and cylinder too are numbered beginning with 0.

For MMD drives with fixed heads, the fixed portion and the moveable head portion are consideres one volume each. That is, the moveable cylinder with the highest number is not followed by the fixed head cylinder 896.

In the same way the fixed and removeable media of the CMD are considered one volume each.

For SMD and MMD the track format described below leave time enough for head change between sector 31 of a track and the index mark so that you don't loose the time for a revolution when changing track within a cylinder, refer to section 3.1.3.3 .

In the case of CMD, one revolution (17 ms) is lost when changing track.

3.1.1.3 Format

SMD and MMD:
Physically each track is divided into 33 sectors. Sector 0 - 31 are the logical sectors contained in the track. Sector 32 is only about a thirteenth of each of the other sectors and is used as a space for head change. Sector 32 is not delt with in the text below. CMD: Physical number of sectors equals logical number (32 sectors)

The length of each sector is 419 (420 for CMD) sector clock counts (5.2.2-1 in [1]). That means, that the preset switches for the sector clock counter in the SMD or MMD must be set as defined in table 3-A (cf. p. 1-17 in [4]).

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Sector count switch settings for SMD and MMD:		
Switch nr.	0 = open x = closed	value
0	0	1
1	x	0
2	0	4
3	0	8
4	0	16
5	x	0
6	0	64
7	x	0
8	x	0
9	0	512
1o	0	1o24
11	0	2048
SUM		3677

TABLE 3 - A

Sector count switches for CMD: TBD.

The sector length (419 sector clocks) equals 628.5 bytes of 8 bit each. These are used as shown overleaf. In the serial bit stream, the first bit in each byte is LSB, and the lower byte of a word precedes the upper byte. Furthermore when transferring data between disk and memory, the first word on the disk will be the one with the lowest memory address.
The individual fields are described on the following pages.

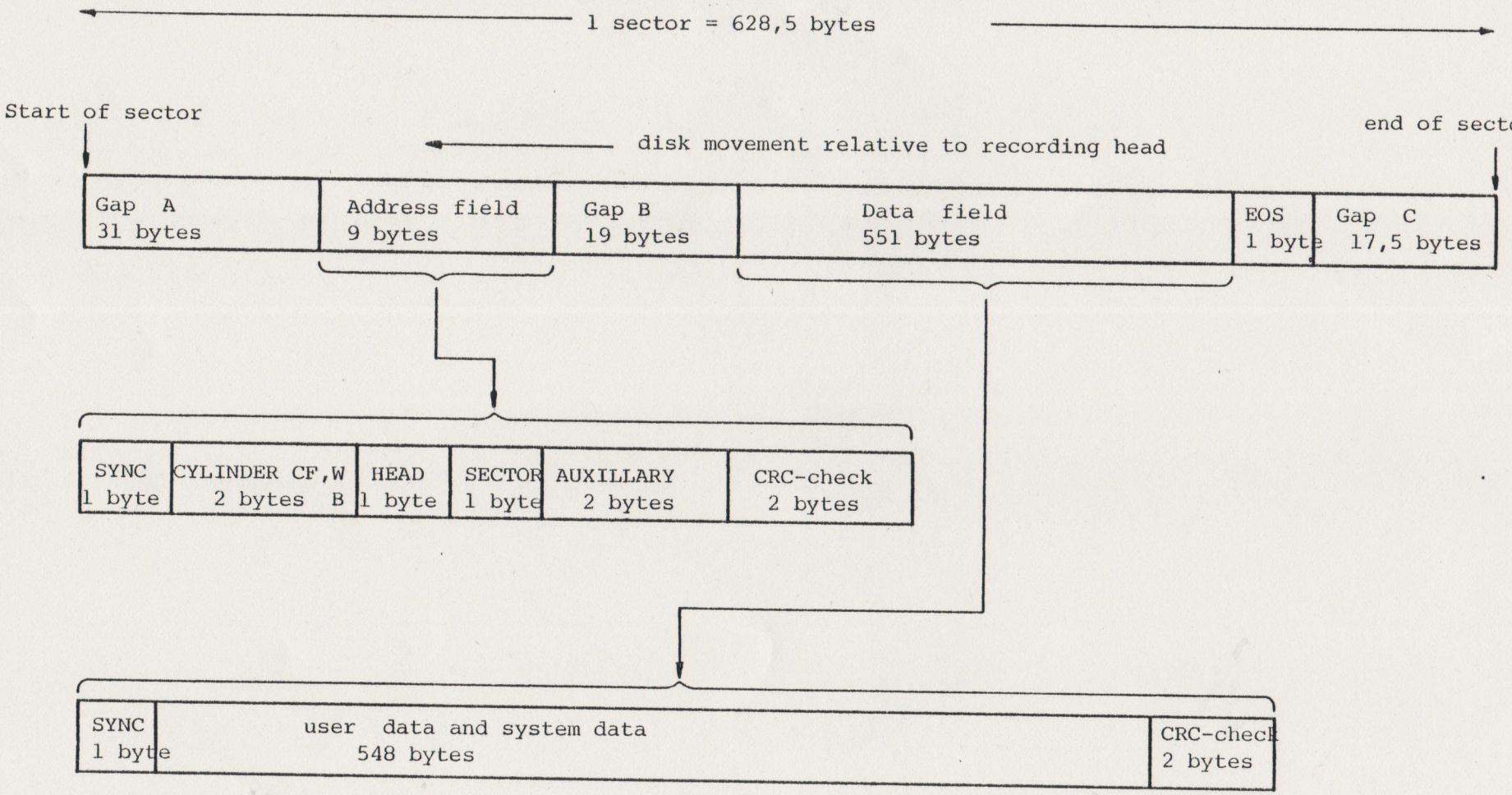
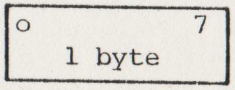


Figure 3 - 2 Sector Format

In each byte the first bit is LSB:



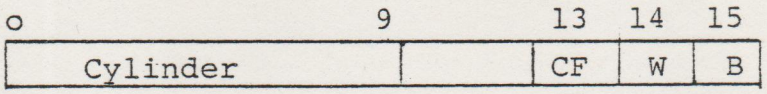
Gap A: 31 bytes of zeroes. Necessary for:

1) mechanical tolerances between servo head and recording head.
2) write splice and read PLO syncronization.

Address field: Identifies the sector unambiquously within the disk volume and contains some information about the sector. May be written by format operations (group 2) only.

SYNC: used by the DIF for byte syncronization.

CYLINDER,CF,W,B:



B: a "1" indicates that the sector is marked as "bad" (set by S/W) and thus can't be used.

W: a "1" indicates write protection. The DIF will not write the datafield af this sector by a normal write operation (group 0). This bit is set by S/W.

CF and CYLINDER are together with HEAD and SECTOR the total sector address within the disk volume in accordance with appendix B.

HEAD and SECTOR: see CF and CYLINDER above.

Auxillary: These bytes may be used as desired by S/W, Refer to section 3.1.3.5.2

CRC-check: 2 bytes Cyclic Redundance Code generated and checked by the DIF.

The CYLINDER, CF, W, B, HEAD and SECTOR are read and checked by the DIF before every reading or writing of the data field (operations group 0). The S/W may access the address field by operations af group 2.

Gap B: used for write splice and read PLO syncronization when writing/reading the data field independently of address field. Gap B consists of 19 bytes of zeroes.

Data field: is the actual contents of the sector extended with SYNC and CRC.

SYNC: used by the DIF for byte syncronization.

User data and system data: are transferred to or from memory as one block by operations of group 0 and 2. The memory buffer must be min 274 words in length.

CRC-check: 2 bytes Cyclic Redundance Code generated and checked by the DIF.

EOS: used by the DIF to ensure that the end of the sector has not been destroyed. This might happen for instance if the next sector has been written on a drive which exceeds the mechanical tolerances allowed by Gab C.

Gap C: The rest of the sector (nominal 17.5 bytes) is skipped allowing for mechanical tolerances between servo head and recording head.