Key A : usually for reading
Key B : usually for writing
AB : Access bits, specify type of data blocks 0, 1 and 2 (read/write block **OR** value block = used for credits, electronic purse functions)
Bytes 6, 7 and 8 are used for AC (access conditions for sector trailer and data blocks)
Byte 9 of AB of the sector trailer is available for user data

Les AB sont utilisés pour définir les AC :
- L'accès read/write des bytes key A, des AB, et de key B
- L'accès aux data blocks (read/write et increment/decrement si utilisés comme value blocks)

Structure de la mémoire

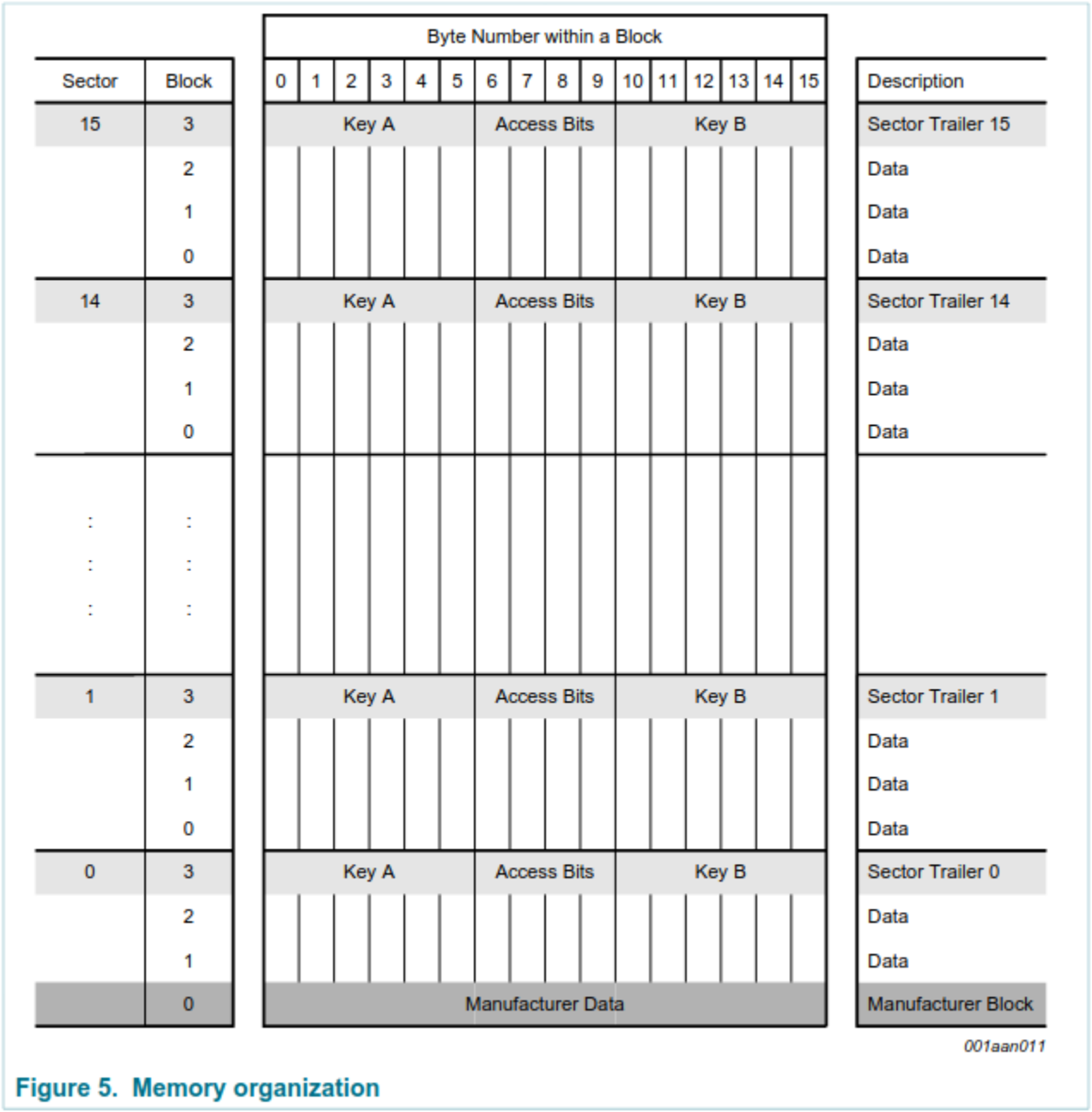

Figure 5. Memory organization

Table 7. Access conditions for the sector trailer

Access bits			Access condition for						Remark
			KEYA		Access bits		KEYB		
C1	C2	C3	read	write	read	write	read	write	
0	0	0	never	key A	key A	never	key A	key A	Key B may be read[1]
0	1	0	never	never	key A	never	key A	never	Key B may be read[1]
1	0	0	never	key B	key A|B	never	never	key B	
1	1	0	never	never	key A|B	never	never	never	
0	0	1	never	key A	key A	key A	key A	key A	Key B may be read, transport configuration[1]
0	1	1	never	key B	key A|B	key B	never	key B	
1	0	1	never	never	key A|B	key B	never	never	
1	1	1	never	never	key A|B	never	never	never	

[1] For this access condition key B is readable and may be used for data

Table 8. Access conditions for data blocks

Access bits			Access condition for				Application
C1	C2	C3	read	write	increment	decrement, transfer, restore	
0	0	0	key A|B	key A|B	key A|B	key A|B	transport configuration[1]
0	1	0	key A|B	never	never	never	read/write block[1]
1	0	0	key A|B	key B	never	never	read/write block[1]
1	1	0	key A|B	key B	key B	key A|B	value block[1]
0	0	1	key A|B	never	never	key A|B	value block[1]
0	1	1	key B	key B	never	never	read/write block[1]
1	0	1	key B	never	never	never	read/write block[1]
1	1	1	never	never	never	never	read/write block

[1] If key B may be read in the corresponding Sector Trailer it cannot serve for authentication (see grey marked lines in Table 7). As a consequences, if the reader authenticates any block of a sector which uses such access conditions for the Sector Trailer and using key B, the card will refuse any subsequent memory access after authentication.

Une fois que les AC sont définies pour chacun des blocks (0,1 et 2)

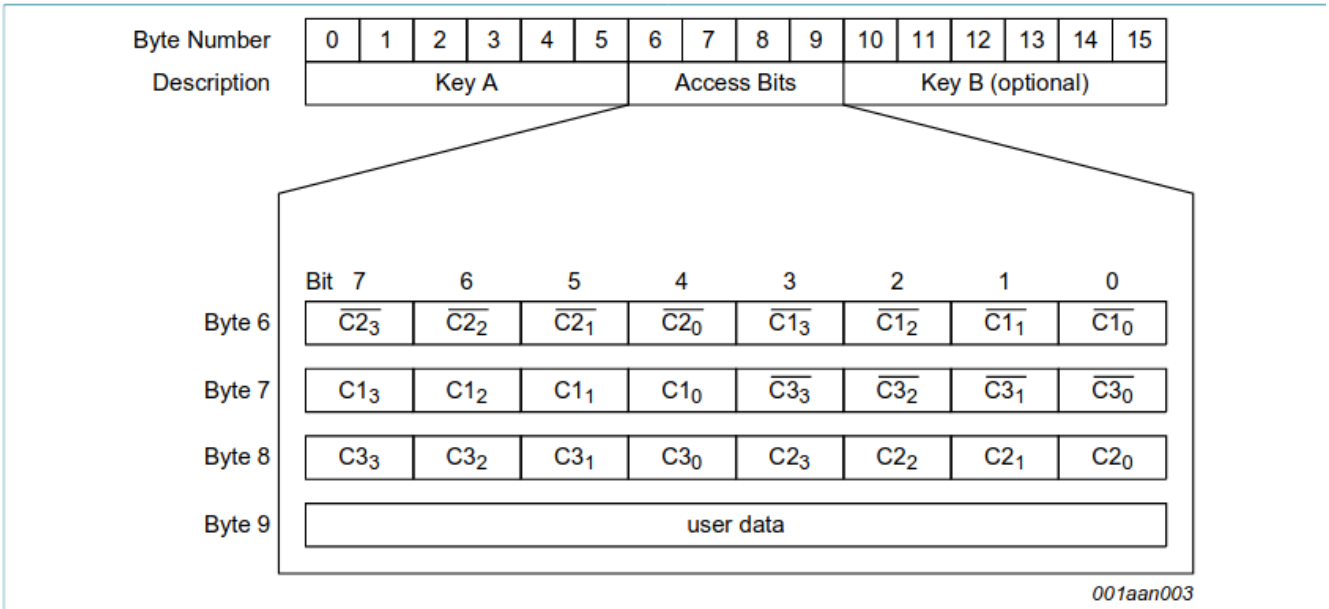

Figure 10. Access conditions

Exemple concret : Cij (indice i cf tableaux, secteur j)

C10 = 1, C20 = 1, C30 = 0,
C11 = 1, C21 = 1, C31 = 0,
C12 = 1, C22 = 1, C32 = 0,
C13 = 0, C23 = 1, C33 = 1

Bytes 6, 7 et 8 sont alors : (cf fig 10 ci-dessus)
0 0 0 0 1 0 0 0 - 0 1 1 1 0 1 1 1 – 1 0 0 0 1 1 1 1
Soit en hexa : 08 77 8F, rappel le byte 9 est utilisé comme user data.

When the sector trailer is read, the key bytes are blanked out by returning logical zeros.
If key B is configured to be readable, the data stored in bytes 10 to 15 is returned.

All keys are set to FFFF FFFF FFFFh at chip delivery and the bytes 6, 7 and 8 are set to FF 07 80 h.

{
"Created": "MifareClassicTool",
"FileType": "mfcard",**12 62 A1 4C 9D**
"blocks": {

Secteur 0 (NUID 4 bytes / UID 7 bytes - Red part = IC manufacturer data)
12 62 A1 4C 9D 17
"0": "**72 EF 1B 66 E0** 88 04 00 C8 20 00 **20** 00 00 00 18", # Block 0 (NUID 4 bytes - Manufacturer data)
"1": "00000000000000000000000000000000", # Block 1 (data)
"2": "00000000000000000000000000000000", # Block 2 (data)
"3": "FFFF FFFF FFFF - FF 07 80 5A - FFFF FFFF FFFF", # Block 3 (key A - AB - key B)

Secteur 1
"4": "00000000000000000000000000000000", # Block 0 (data)
"5": "00000000000000000000000000000000", # Block 1 (data)
"6": "00000000000000000000000000000000", # Block 2 (data)
"7": "FFFF FFFF FFFF - FF 07 80 69 - FFFF FFFF FFFF", # Block 3 (key A - AB - key B)

Secteur 2
"8": "00000000000000000000000000000000", # Block 0 (data)
"9": "00000000000000000000000000000000", # Block 1 (data)
"10": "00000000000000000000000000000000", # Block 2 (data)
"11": "FFFF FFFF FFFF - FF 07 80 69 - FFFF FFFF FFFF", # Block 3 (key A - AB - key B)

Secteur 3
"12": "00000000000000000000000000000000", # Block 0 (data)
"13": "00000000000000000000000000000000", # Block 1 (data)
"14": "00000000000000000000000000000000", # Block 2 (data)
"15": "FFFF FFFF FFFF - FF 07 80 69 - FFFF FFFF FFFF", # Block 3 (key A - AB - key B)

Secteur 4
"16": "00000000000000000000000000000000", # Block 0 (data)

"17": "00000000000000000000000000000000", # Block 1 (data)
"18": "00000000000000000000000000000000", # Block 2 (data)
"19": "FFFF FFFF FFFF - FF 07 80 69 - FFFF FFFF FFFF", # Block 3 (key A - AB - key B)

Secteur 5

"20": "00000000000000000000000000000000", # Block 0 (data)
"21": "00000000000000000000000000000000", # Block 1 (data)
"22": "00000000000000000000000000000000", # Block 2 (data)
"23": "6A19 87C4 0A21 - F7 8F 00 5A - 7F33 625B C129", # Block 3 (key A - AB - key B)

Secteur 6

"24": "00000000000000000000000000000000", # Block 0 (data)
"25": "00000000000000000000000000000000", # Block 1 (data)
"26": "00000000000000000000000000000000", # Block 2 (data)
"27": "6A19 87C4 0A21 - F7 8F 00 5A - 7F33 625B C129", # Block 3 (key A - AB - key B)

Secteur 7

"28": "00000000000000000000000000000000", # Block 0 (data)
"29": "00000000000000000000000000000000", # Block 1 (data)
"30": "00000000000000000000000000000000", # Block 2 (data)
"31": "6A19 87C4 0A21 - F7 8F 00 5A - 7F33 625B C129", # Block 3 (key A - AB - key B)

Secteur 8

"32": "00000000000000000000000000000000", # Block 0 (data)
"33": "00000000000000000000000000000000", # Block 1 (data)
"34": "00000000000000000000000000000000", # Block 2 (data)
"35": "6A19 87C4 0A21 - F7 8F 00 5A - 7F33 625B C129", # Block 3 (key A - AB - key B)

Secteur 9

"36": "00000000000000000000000000000000", # Block 0 (data)
"37": "5404DE0315235511000000000000000", # Block 1 (data)
"38": "00000000000000000000000000000000", # Block 2 (data)
"39": "6A19 87C4 0A21 - F7 8F 00 5A - 7F33 625B C129", # Block 3 (key A - AB - key B)

Secteur 10

"40": "00000000000000000000000000000000", # Block 0 (data)
"41": "00000000000000000000000000000000", # Block 1 (data)
"42": "00000000000000000000000000000000", # Block 2 (data)
"43": "6A19 87C4 0A21 - F7 8F 00 5A - 7F33 625B C129", # Block 3 (key A - AB - key B)

Secteur 11

"44": "00000000000000000000000000000000", # Block 0 (data)
"45": "00000000000000000000000000000000", # Block 1 (data)
"46": "00000000000000000000000000000000", # Block 2 (data)
"47": "6A19 87C4 0A21 - F7 8F 00 5A - 7F33 625B C129", # Block 3 (key A - AB - key B)

Secteur 12

"48": "00000000000000000000000000000000", # Block 0 (data)
"49": "00000000000000000000000000000000", # Block 1 (data)
"50": "00000000000000000000000000000000", # Block 2 (data)

"51": "6A19 87C4 0A21 - F7 8F 00 5A - 7F33 625B C129", # Block 3 (key A - AB - key B)

Secteur 13

0D D2 D0 A8 - A9 A3 6E 79 - B0 6A 91 AC - 3D AE 2A 00

"52": "**84 F2 D7 ED - 41 A6 E4 00 - EE 9E 6C 12 - D2 A9 58 00**", # Block 0 (data)
"53": "00000000000000000000000000000000", # Block 1 (data)
"54": "00000000000000000000000000000000", # Block 2 (data)
"55": "6A19 87C4 0A21 - F7 8F 00 5A - 7F33 625B C129", # Block 3 (key A - AB - key B)

Secteur 14

26 79 00

"56": "**32 1D 0**0 E6 - 00 40 00 00 - 00 00 00 00 - 49 00 00 00", # Block 0 (data)
"57": "00 2B D4 0D - 87 82 42 D9 - 09 BF 99 15 - 04 4D 11 63", # Block 1 (data)
"58": "37 2A F3 EA - 6B 02 6F 10 - B7 77 20 A0 - 03 85 58 83", # Block 2 (data)
"59": "6A19 87C4 0A21 - F7 8F 00 5A - 7F33 625B C129", # Block 3 (key A - AB - key B)

Secteur 15

"60": "E0FF00000048EF481F00FFFFFFB710B7", # Block 0 (data)
"61": "FF81EF00100200B50000000000000000", # Block 1 (sdata)
"62": "FFFF 0EF1 81A6 765B 81F9 C941 79B3 8A85", # Block 2 (data)
"63": "6A19 87C4 0A21 - F7 8F 00 5A - 7F33 625B C129" # Block 3 (key A - AB - key B)
}
}

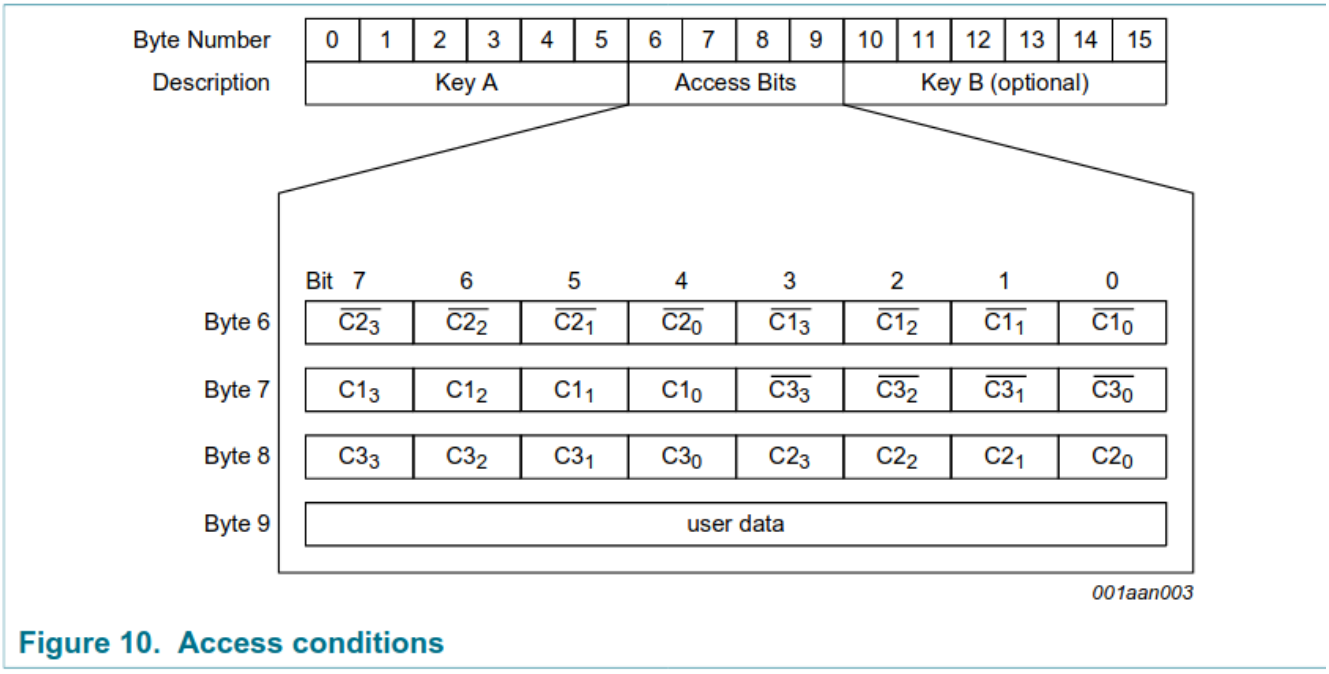

Figure 10. Access conditions

Mifare classic tool suggestion :

08 77 8F
00001000 – 01110111 – 10001111

C10 = 1, C20 = 1, C30 = 0,
C11 = 1, C21 = 1, C31 = 0,
C12 = 1, C22 = 1, C32 = 0,
C13 = 0, C23 = 1, C33 = 1

FF - 07 - 80 <=> 11 11 11 11 – 00 00 01 11 – 10 00 00 00

C10 = 0, C20 = 0, C30 = 0,
C11 = 0, C21 = 0, C31 = 0,
C12 = 0, C22 = 0, C32 = 0,
C13 = 0, C23 = 0, C33 = 1

Secteur trailer (#3) :

Key A		AB		Key B	
Read	Write	Read	Write	Read	Write
Never	Key A	Key A	Key A	Key A	Key A

Key B may be used for data…

Block (# 0,1, and 2) :

Read	Write	Increment	Decrement
Key A|B	Key A|B	Key A|B	Key A|B

F7 8F 00 <=> 11110111 - 10001111 - 00000000

C10 = 0, C20 = 0, C30 = 0,
C11 = 0, C21 = 0, C31 = 0,
C12 = 0, C22 = 0, C32 = 0,
C13 = 1, C23 = 0, C33 = 0

Secteur trailer (#3) :

Key A		AB		Key B	
Read	Write	Read	Write	Read	Write
Never	Key B	Key A|B	never	never	Key B

Block (# 0,1, and 2) :

Read	Write	Increment	Decrement
Key A|B	Key A|B	Key A|B	Key A|B

https://github.com/zhovner/mfdread