



Memory Stick Information for Developers

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■ Logical Formats

Objective

As logical format, the followings are defined to assure “connectivity”

- Data Structure Layer
- Fat File System
- Operation
 - Digital Read Protect Bit
 - Cluster Border and Block Border
 - Special File

Here explained is Memory Stick logical format objectives.

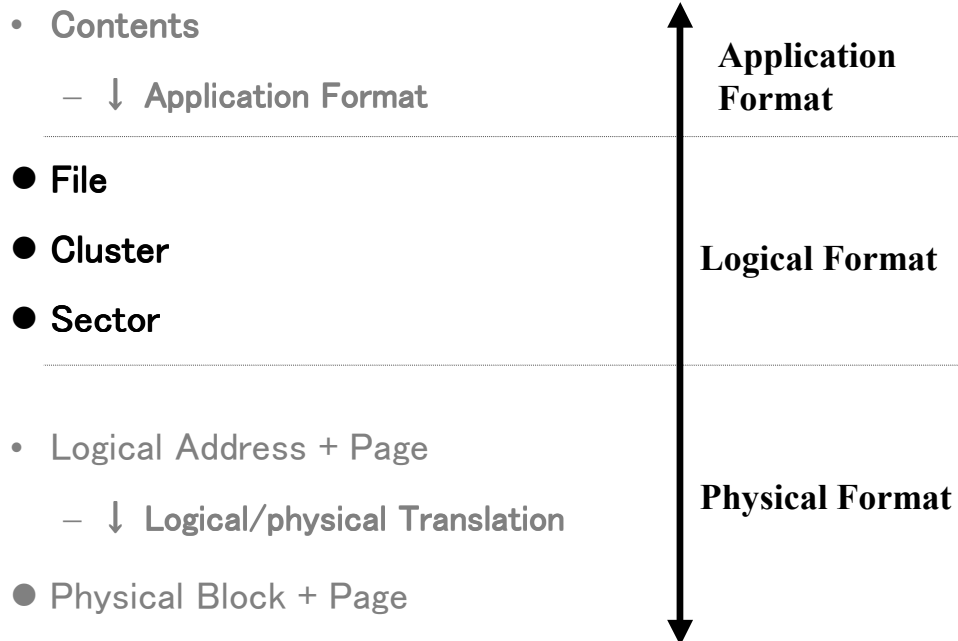
Memory Stick concept, “connectivity” is the premise.

To realize it, data structure layer and FAT file system are used. Operation is done by digital read protect bit, cluster border and block border and special file.

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Data Structure



Memory Stick data structure layer.

Data structure layer order is contents, file, cluster, sector, logical address&page, physical block & page.

Physical format already explained is the lowest layer. It executes logical/physical translation between physical block or page concept and logical address or page.

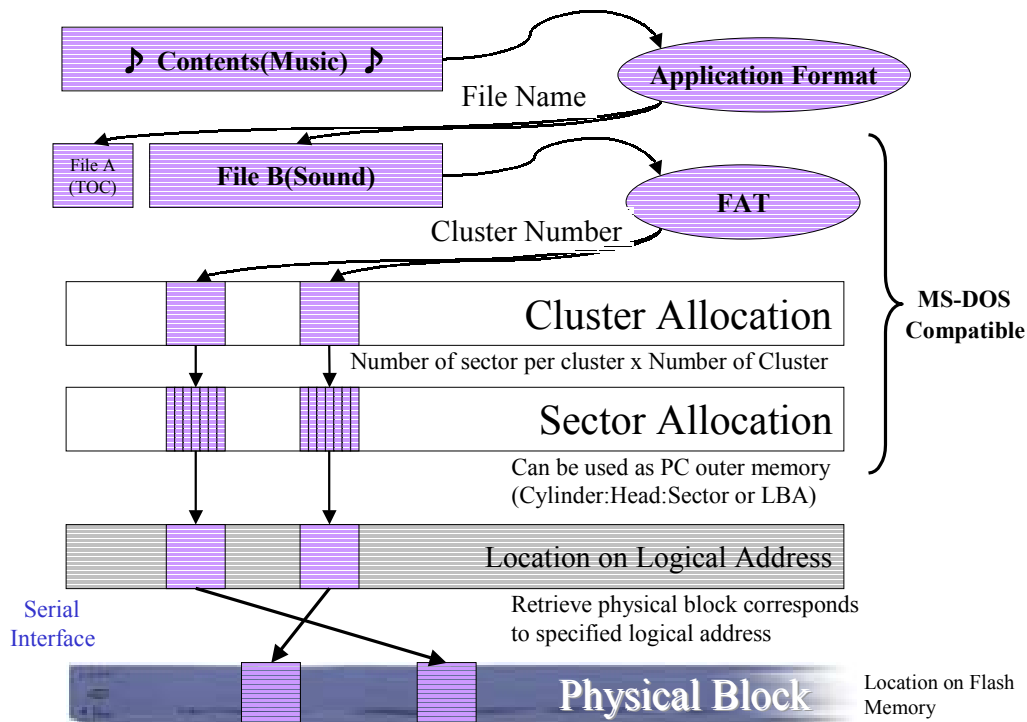
In upper layers, contents and related application format are defined.

Logical format is between application format and physical format. File, cluster and sector belongs to logical format.

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Layer Concept



Data layer concept when storing music data.

Music manage/playback application software makes a file, which will be separated to TOC information and music data and file system will be made in MS-DOS compatible format(FAT).

According to this file system, file will be divided by the cluster.

Cluster will be further divided into sectors and will be accessed as outer PC memory. It is managed in MS-DOS file management method.

Then allocation of the sector will be directly corresponding to location on logical address.

Lastly, when writing in Memory Stick, physical block corresponds to logical address will be overwritten every time data is written.

This means that write process is executed by retrieving physical block corresponds to logical address of data to be updated from logical/physical translation table.

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FAT File System

- MS-DOS® Compatible
 - MBR
 - PBR
 - FAT
 - FAT Entry
 - FAT Entry Copy
 - Directory Entry
 - File Area
- Accessible as outer memory device from PC
 - Same configuration with HDD, FD

Fat file system.

FAT file system is used and consists of MBR, PBR, FAT, Root directory entry, file area.

File system is MS-DOS compatible.

It is accessible as outer memory device from PC.

MBR: Master Boot Record

PBR: Partition Boot Record

FAT: Data area to store data location in Memory Stick

Directory Entry:

File Area:

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Operation

- Digital Read Protect Bit
 - Applicable only to User Data
 - Management Flags in one file have to be the same
- Cluster Border and Block Border
 - Cluster border and block border should match each other in format, but when formatted by Windows, there can be mismatch.
 - Set has to format according to recommended format

Operations

First, digital read protect bit is defined.

This is only applicable to user data. Management flags in one file have to be the same.

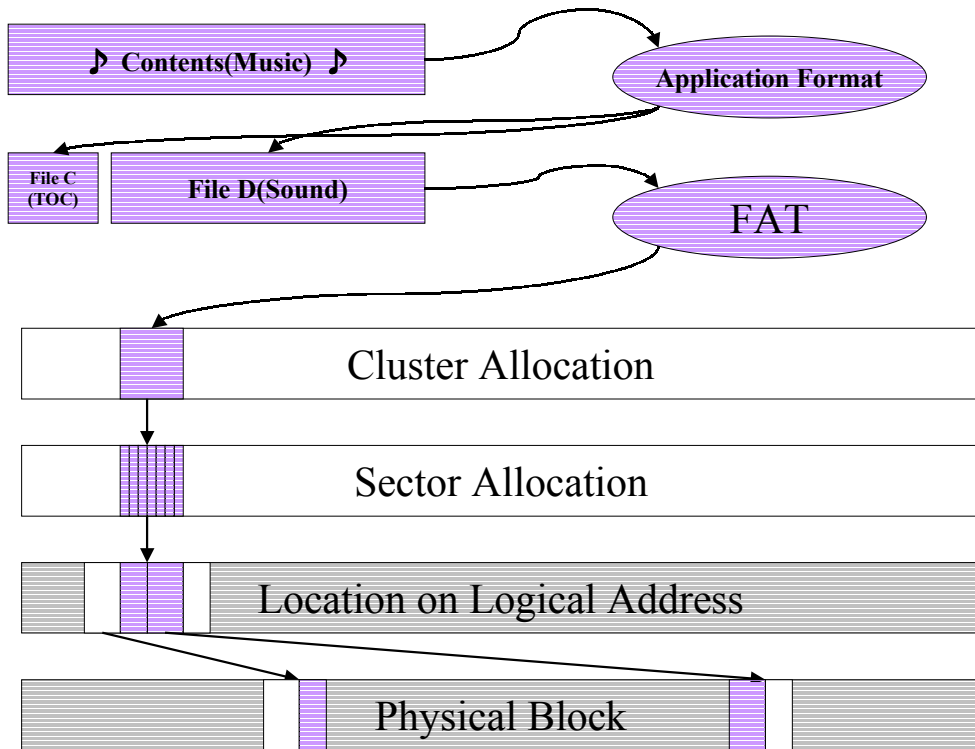
Cluster border and flash memory block borders should match in Memory Stick format, but can be different.

Set has to format according to recommended format.

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Layer Concept (Not Preferable)



Layer image, not preferable example.

When cluster border and physical block border do not match, data of a cluster can be written in the wrong block on flash memory. This can cause low performance to process data real-time and process will be complicated.

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Others

- Special File
 - To distinguish Memory Stick from other media
 - File name is “MEMSTICK.IND” , file size is 0 byte.
 - Created upon format processing (factory-out)
- File(Directory) Name
 - 8.3 format
 - File/directory name under root directory is fixed
 - File/directory name of application is specified respectively

Memory Stick special file and directory name regulations.

Special file is used to distinguish Memory Stick from other media. File name is “MEMSTICK.IND” , and file size is 0 byte. It is created upon format processing (factory-out)

File(Directory) Name is 8.3 format. File/directory name under root directory is fixed. Directory name of application is specified respectively

8.3 format is file name up to 8 characters and extension up to 3 characters.